BUYERS' GUIDE NUMBER POWER

MID-DECEMBER 1939

VOLUME 83 - NUMBER 13

A McGRAW-HILL PUBLICATION

★

NEXT YEAR For the past three years, Mid-December POWER has carried a "Review of the Year" plus annual tabulations of steam and hydro plants. This year, in setting up the Buyers' Guide Number as a coherent whole, such information seemed out of place.

Naturally, then, the Review of the Year has moved up to its old spot in the January issue. To permit inclusion of the many plants planned for the first half of 1940, the tabulations will appear in September, 1940, in a 16-page section, along with design trends of turbines, generators, and hydro units, data on features of latest steam- and hydro-plant practice.

Foreword—Handbook for Action 55

Annual Review—Power and Mechanical Equipment . . . 56

ASME Annual Meeting Report 91

High-Pressure, High-Temperature Experience 91

Fuel Selection and Flyash Control 95

Prime Mover and System Regulation 96

Results of Lubrication Tests 98

Turbine-Blading Tests; More Data on H-P Steam 100

Method of Comparing Boiler Performance 102

Photo Highlights, Awards 110

Review of Catalogs and Bulletins 104

George Edwards—A Christmas Message 128

Buyers' Guide—What and Where to Buy 155

N. O. WYNKOOP
Publisher

PHILIP W. SWAIN
Editor

E. J. TANGERMAN
Consulting Editor

F. A. ANNETT — B. E. SAWYER
S. A. TUCKER — L. N. ROWLEY
Associate Editors — *Assistant Editors*

PAUL WOOTON
Washington

G. C. TENNEY — H. S. KNOWLTON
San Francisco — *Boston*

COPYRIGHT, 1939, McGRAW-HILL PUBLISHING COMPANY, INC.
JAMES H. McGRAW, Founder and Honorary Chairman

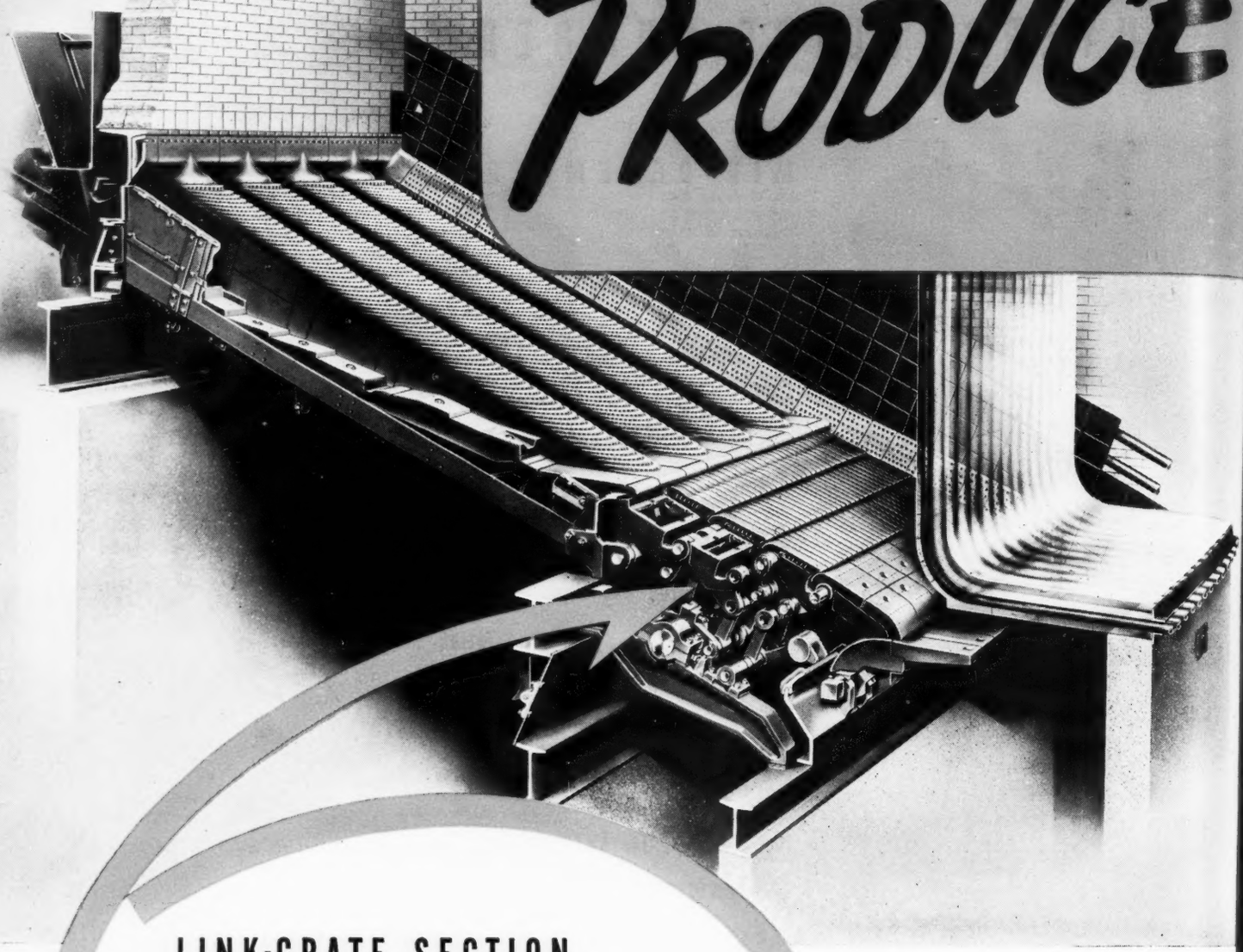
JAMES H. McGRAW, JR., President — HOWARD EHRLICH, Executive Vice-President — MASON BRITTON, Vice-Chairman

B. R. PUTNAM, Treasurer — D. C. McGRAW, Secretary — J. E. BLACKBURN, JR., Director of Circulation

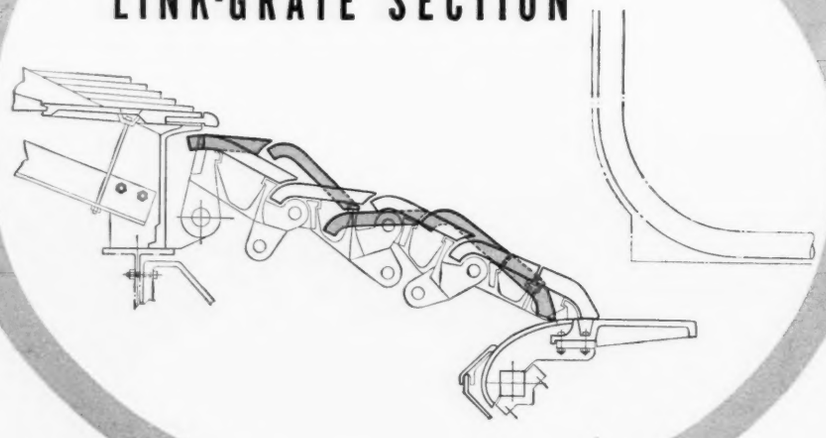
CHICAGO, 520 North Michigan Ave.
SAN FRANCISCO, 68 Post St.
WASHINGTON, National Press Bldg.
PHILADELPHIA, 16 South Broad St.
CLEVELAND, 1510 Hanna Bldg.
DETROIT, 2-144 General Motors Bldg.
ST. LOUIS, 455 Paul Brown Bldg.
BOSTON, 1427 Statler Bldg.
ATLANTA, 1105 Rhodes Haverty Bldg.
LONDON, Aldwych House, Aldwych, London, W. C. 2

Publication office: 99–129 North Broadway, Albany, N. Y. Editorial and executive offices: 330 West 42nd St., New York, N. Y. Member A. B. P. Member A. B. C. POWER articles are currently indexed in both the Industrial Arts and the Engineering Indexes, available at public libraries. Also every year POWER issues an annual index of its own. Cable address: "McGraw-Hill, N. Y."

PRODUCE



LINK-GRATE SECTION



THE LINK-GRATE PRINCIPLE RESULTS IN THOROUGH COMBUSTION

GRATES UP—opens up fuel bed —lets air through—promotes combustion—keeps grates cool.

GRATES DOWN — fuel bed cracks—limits size of clinker formation.

Westinghouse

YOUR STEAM AT LOWER COST

WITH LINK-GRATE'S *BETTER* COMBUSTION... BURN *LESS* COAL...BURN *CHEAPER* COAL

In many plants, the ways to save money on power costs are pretty obvious. When equal results can be secured from burning less fuel, or a cheaper grade of fuel, the direct effects on operating costs are clear.

The continuous wave-like motion of the Link-Grates keeps the fuel bed agitated and assures correct air flow. This eliminates troublesome clinker formation and keeps the grates cool, thereby reducing maintenance expense.

Lower grades of coal can be burned, often with improved boiler efficiency, and the coal is handled and burned safely.

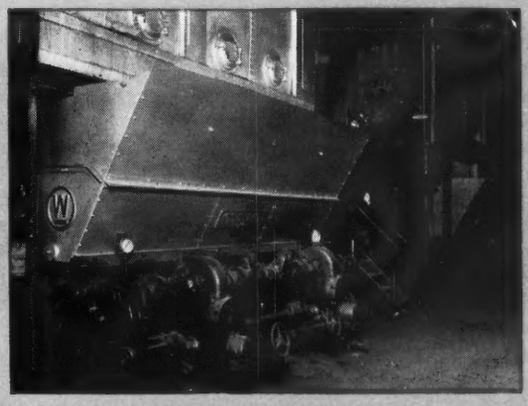
Records of plants using Link-Grate Stokers are positive proof of these advantages and savings. There are many of these plants—some near you.

An experienced combustion engineer will gladly inspect your plant. He may be able to show you the way to substantial savings. Call any Westinghouse office.

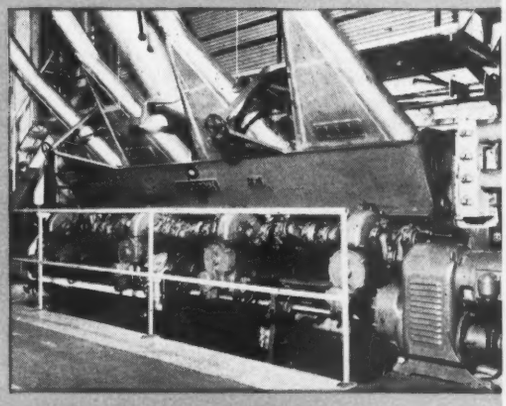
J-50294

PLANTS EVERYWHERE ARE MAKING SAVINGS LIKE THESE...SOME NEAR YOU

One of Nine Westinghouse Link-Grate Stokers in four plants of a large farm implement manufacturer.



Howard Paper Co., Urbana, Ohio, saves through improved boiler efficiency and 25% reduction in coal costs.



Crowell Collier Publishing Co., Springfield, O., uses Link-Grate Stokers and saves on coal and maintenance.

SINGLE RETORT
MULTIPLE RETORT **Stokers**

W WESTINGHOUSE ELECTRIC

CORROSION COSTS YOU MORE THAN WROUGHT IRON

HOW THE PAGE MILK COMPANY COFFEYVILLE, KAN., PLANT SOLVES 4 MAINTENANCE PROBLEMS

WITH

BYERS WROUGHT IRON

The Page Milk Company—a large manufacturer of condensed milk with five plants scattered through the middle west—experienced severe corrosion difficulties with hot and cold water supply lines, boiler feed lines, and heating return lines at its Coffeyville, Kan., plant. Knowing that service under actual operating conditions is the only reliable index to pipe life, the engineers tried out various materials to find the one that would lick the corrosive condition. On the basis of this experience, Byers Wrought Iron was selected, and is now serving in all four applications.

Experiences like this are profitable tips for the maintenance man with a corrosion problem in heating, cooling, plumbing or process tanks or piping. They also make it unnecessary for you to carry on costly experiments in locating the material that will do the best job for you.

Through the friendly cooperation of hundreds of pipe users, Byers has accumulated a great amount of data on the service life of Byers Wrought Iron in all sorts of applications and conditions. If you have a problem where corrosion is causing premature failure and heavy maintenance expense, just write us the details. Our Engineering Service Department will (1) Determine the probable corrosive conditions; (2) Relate these to similar conditions encountered elsewhere; (3) Interpret the results in the light of 75 years' experience with corrosion problems, and (4) Make recommendations . . . supported by service records. For a better picture of the many places where corrosion has been proven to cost more than wrought iron, ask for a complimentary copy of our bulletin, "101 Uses for Wrought Iron."

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Chicago, St. Louis, Houston, Seattle, San Francisco.

BYERS GENUINE WROUGHT IRON

TUBULAR AND FLAT ROLLED PRODUCTS

Specify Byers Genuine Wrought Iron Pipe for corrosive services and Byers Steel Pipe for your other requirements

POWER

Established 1882 PHILIP W SWAIN, Editor

HANDBOOK OF ACTION

Right ahead lies 1940, a year of many and notable power decisions, all signs indicate. Plants that have been limping along for years already feel the pressure to deliver more power services, of better quality and of greater reliability. Under-sized and decrepit, they barely get by today, are clearly inadequate for tomorrow.

The war may have something to do with it, but the primary cause is a broad business upsurge that was well under way before Europe rushed to arms, plus power machines debilitated by ten years of hard labor on a starvation diet. Thousands of plants are still operating boilers, engines and other power-service equipment already obsolete back in the gay days of 1929. In 1939 they labor under an additional decade of out-of-date-ness and plain everyday wear.

Clearly, 1940 must be a year of decision and action for power men everywhere. Here's the formula: Have a plan—line up ways to execute the plan—decide and act. Planning, deciding and acting are up to the individual engineer. That leaves the big job of lining up information on latest developments.

To help him in this, POWER offers practical assistance in a four-part handbook of buying facts and sources, arranged for quick and easy finding:

1—*New Equipment of 1939*—400 items of design progress pictured and briefly described (page 56).

2—*New Power Ideas*—ASME annual meeting report (page 91).

3—*Detailed Product Information*—Over 400 new catalogs and bulletins reviewed (page 104). You can use the business reply cards (page 119) to order the ones you want.

4—*What and Where to Buy*—800 manufacturers listed under 400 classifications (page 155).

This is not one of the regular monthly issues of POWER. You have them, all twelve, designed as a continuing education in the ever-advancing power technique. Keep this by itself on your quick-reference shelf, ready for instant and repeated use throughout 1940.

Review of Power and Mechanical Equipment

In the pages that follow, POWER *presents its twelfth annual review of new and improved equipment. The 400 descriptions presented here are summaries of those which have appeared in* POWER *since January 1, 1939, plus additional items received in the past month.*

Boilers, Stokers, Refractories and Accessories 56
Compressors 60
Diesels, Gas Engines and Accessories 61
Heating, Ventilating, Refrigerating, Air Conditioning 63
Hose, Packing and Paints; Lubricating Equipment 66
Mechanical Transmission and Materials Handling 67
Meters and Instruments 71
Miscellaneous 75
Motors, Switches and Other Electrical Equipment 77
Piping, Fittings and Valves 83
Pumps 87
Welding Equipment 90
Wrenches and Other Tools 134

BOILERS, STOKERS, TURBINES AND ACCESSORIES

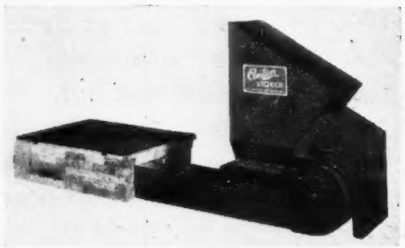
1 FIRE OBSERVER—Observation port covered with Pyrex glass allows operator to inspect interior of furnace or fuel bed while fire is burning. Port is 6 x 4½ in., covered on inside by a shutter. Shutter allows no air in or out, and when raised, lets operator see interior of furnace; when released, covers port entirely. Glass is protected by Monel metal screen when shutter is open. *Detroit Stoker Corp, General Motors Bldg, Detroit, Mich.*

2 WORM-TYPE STOKERS—Canton worm underfeed unit has side ash-dump plates installed in each side of furnace. Sectionally built feed worm, to prevent warping, enables user to replace worn parts without replacing entire worm. Stoker may be internally cleaned without unnecessary dust and fumes. *Canton Stoker Corp, Andrew Place, S W, Canton, Obio.*

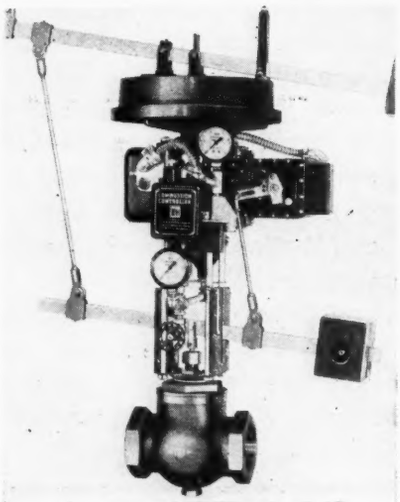
3 CONDENSER-TUBE PLUG—"Made-Rite" condenser-tube plug is similar to boiler-tube plug manufactured by same company, except that packing is composed of layers of rubber and duck and has shoulder instead of flush end. Plug is made of certified malleable iron and may be left in tube as permanent repair until it is convenient to install new tube. Ranges of sizes from ⅜ in. up. *Hardie Made-Rite Boiler Tube Plug Co, 1245 Madison Ave, New York, N. Y.*

4 COMBUSTION REGULATOR—Type V080A designed to hold steam pressure in gas-fired boiler within close limits, and control air supply to burner. Can be installed to fire automatically any radiant or blue-flame burner of atmospheric type. Entire control mounted on gas-valve bonnet at single point. ¼-in. steam supply, exhaust line and connection to electric service completes installation. *Minneapolis-Honeywell Regulator Co, Minneapolis, Minn.*

5 AUTOMATIC STOKERS—1939 line of automatic units, with feeding capacities of 25 lb per hr to 1200 lb per hr, available in 20 sizes. Model *B*, illustrated, has electrical safety device that stops motor in case of overload, which will automatically reset after overload is removed. Included with new line are three improved controls, thermostat, boiler or furnace control, and fire timer. Height of hop-

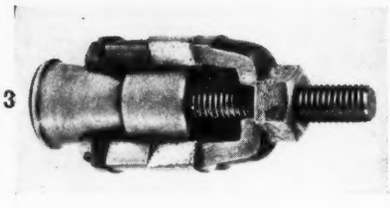


2



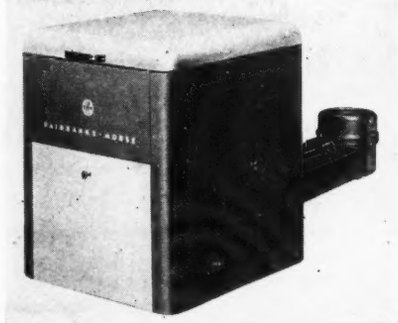
4

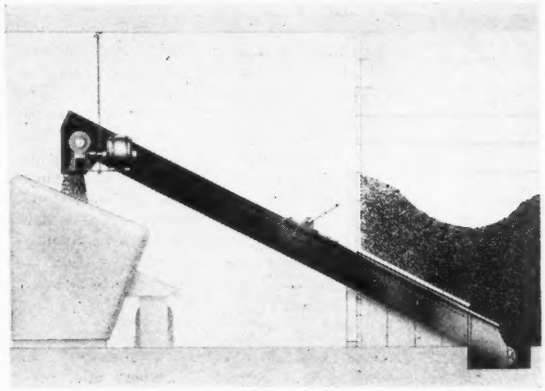
1



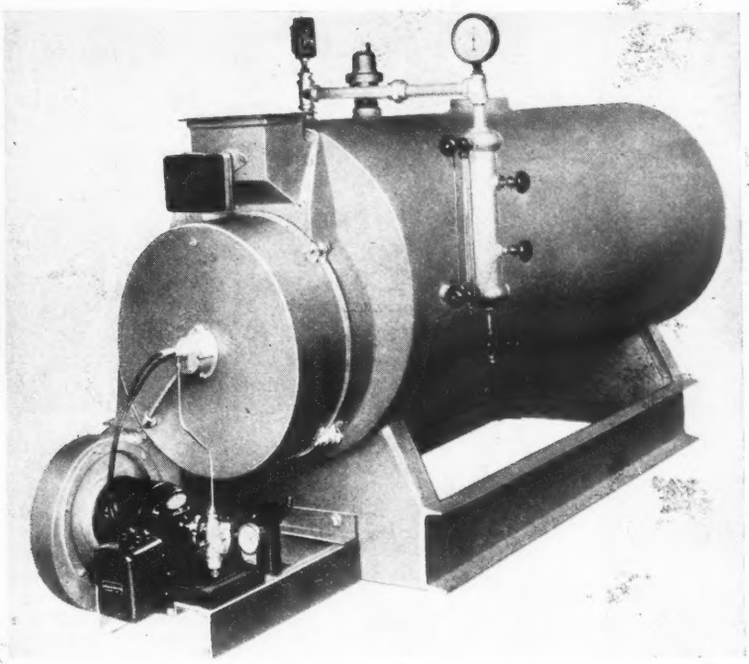
3

5

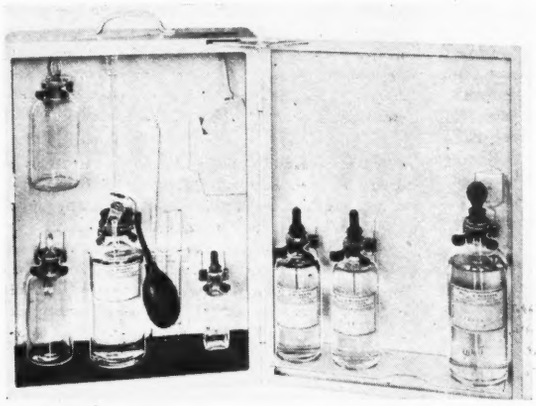




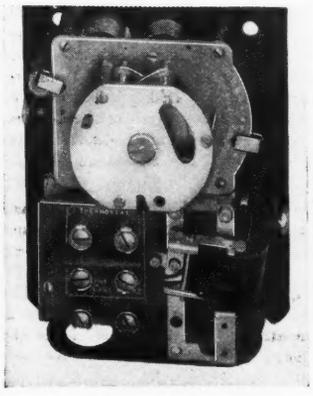
6



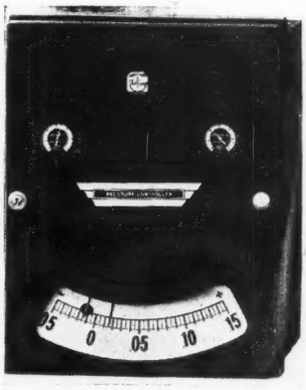
7



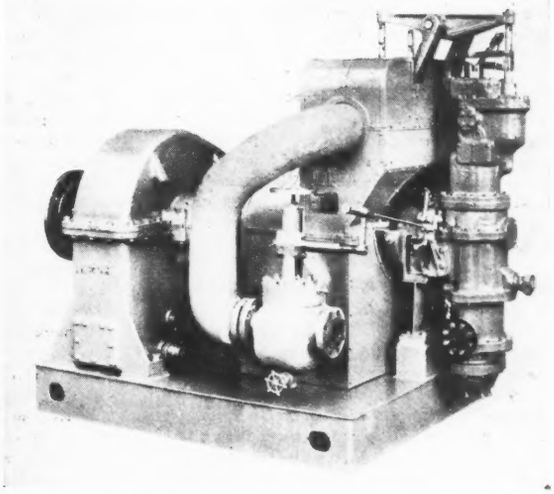
8



9



10



11

per reduced without loss of storage capacity. *Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.*

6 COAL LOADER—Automatic unit to fill stoker hoppers has capacity up to 10 tons per hr. Can be adjusted to meet stoker-room requirements; sole factor governing loader length is distance from coal pile to hopper. Illustrated is ceiling-suspended model; another model is supported by floor stand. Both can be furnished for either right- or left-hand operation. Loader is operated by 1½-hp motor. *D J Murray Mfg Co, Wausau, Wis.*

7 BURNER-BOILER UNIT — Is complete, ready for installation when shipped, and available in models firing light fuel oil, and above 700-sq-ft heating surface. Boilers made in six standard sizes equipped with automatic controls, may be fired by gas as well as oil, operate at positive pressure, and no stack draft is necessary to operation of unit. *General Furnaces Corp, 17 State St, New York, N. Y.*

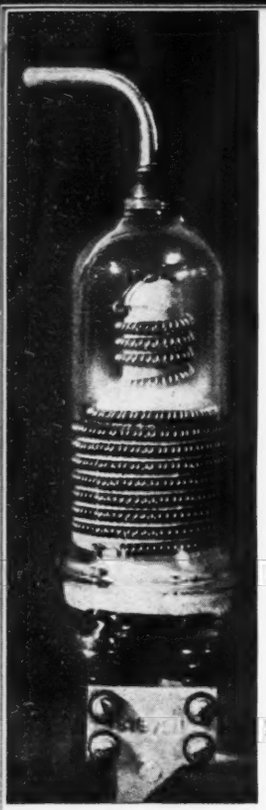
8 OXYGEN TESTER—Testing cabinet determines quantities, if any, of oxygen which may be found in boiler feedwater. The reagent pipettes, or liquid-transfer pipes, have bulbs which automatically measured desired quantity of test solution. An automatic self-leveling burette, or measuring tube, is used in final drop-by-drop measurement. To gather sample to be tested, special sampling bottles minimize danger of trapping air at completion of sampling operation. Cabinet measures 17 x 13 x 7½ in. *Bull & Roberts, 117 Liberty St, New York, N. Y.*

9 COAL-STOKER CONTROLS — "Stok-A Timer" has heat motor instead of usual synchronous motor. Operated by two loop-shaped bimetal coils which are alternately heated and cooled by low-voltage strip heater. As one coil is heating, other is cooling, and both move and supply power to ratchet mechanisms connected to rotating member. Process of heating and cooling causes rotating member to make one rev per hr and to fire stoker in accordance with dial settings. Electrical capacity is 10 amp, 115 v; 5 amp, 230 v. Motor rating 1-hp repulsion-induction, ½-hp split-phase. *Mercoid Corp, 4201 Belmont Ave, Chicago.*

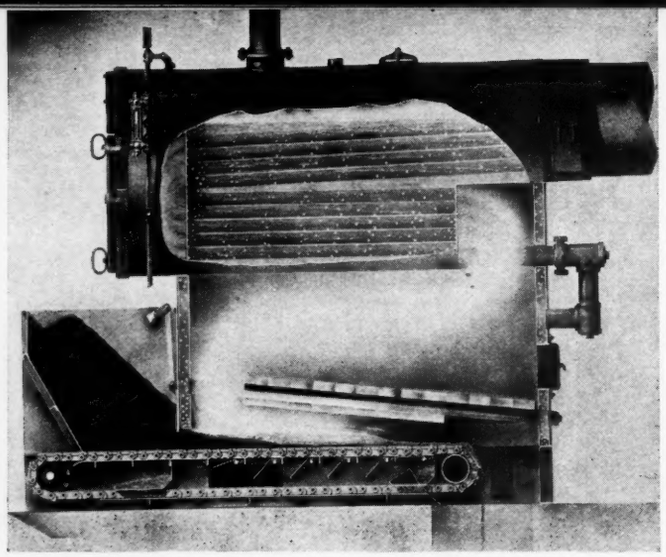
10 FURNACE-PRESSURE CONTROLLER—"Air-O-Line" unit, for all types of furnaces, stills, etc, where low differential or static pressure must be maintained, controls any pressure from —5.0-in to +5.0-in H_2O. Is essentially a sensitive, inverted-bell draft indicator combined with Brown Air-O-Line control unit. Automatic reset and adjustable throttling range prevent furnace pressure from lining out to some point other than control point and eliminate over-correcting and cycling. *The Brown Instrument Co, Philadelphia, Pa.*

11 STEAM TURBINE—Type M improved multi-stage steam turbines, ranging from 100 to 2000 hp, 100 to 550 rpm, are for driving pumps, fans, compressors, pulverizers, etc. Made for condensing-extraction, non-condensing, non-condensing extraction, or mixed-pressure service. Units can be supplied for pressures to 650 lb, temperatures to 750 F, exhaust pressures to 200 lb, vacuum to 29 in., and extraction pressures to 200 lb. *Westinghouse Elect & Mfg Co, E Pittsburgh, Pa.*

FLAME-FAILURE INDICATOR — "Photo-Head", a substitute for standing electrode, affords same protection in case of flame failure. Contains a photoelectric call which acts instantly upon flame failure in furnaces, boilers,



2



1

ovens or heaters. Is hermetically sealed from combustion chamber, permitting application to ovens or furnaces above or below atmospheric pressure. *Wheelco Instruments Co, 1929-1933 S Halstead St, Chicago, Ill.*

1 CHAIN-GRATE HEATING UNIT—Boiler-stoker combination able to burn wide variety of coals. Other features claimed are: simplicity of installation due to boiler being supported directly on stoker side frames, no fire cleaning periods, smokeless operation, low power requirements and low head room. *Illinois Stoker Co, Alton, Ill., & Pacific Steel Boiler Corp, Detroit, Mich.*

2 FLASH-TYPE STEAM GENERATOR—Can generate superheated steam from cold water in less than 15 sec, and is no bigger than ordinary incandescent lamp in size. Rated at a thermal efficiency of 90% because heating coils are directly in water. Made in 1000-, 1500- and 2000-watt sizes, with evaporating capacities up to 5.7 lb of water per hr. Chemical-resistant case able to withstand internal pressures up 25 lb psi. Principal use is where small amounts of steam are required quickly. Over-all size is 9¼ in. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

3 PNEUMATIC SPREADER STOKER—Dual air spreader stoker has two pneumatic conveying systems attached either to a single hopper or to a bin outlet. Fines burn in suspension, as with powdered-coal burner; larger pieces fall on grates and burn in shallow layer, as with conventional overfeed stoker. Streams of high-velocity air convey and spread steam-size coal, which is said to give high degree of turbulence and prevent stratification. May be fired by hand in emergency; made in sizes with capacities up to 3200 lb of coal per hr. *Iron Fireman Mfg Co, Portland, Ore.*

4 DESUPERHEATER—Steam-atomizing type is designed to give complete atomization of desuperheater water at all flows by impact of small quantity of high-pressure steam at constant velocity and thus provide complete range of operation from 0 to maximum. Can be mounted in any plane in any horizontal or vertical line. Atomizing steam is taken from high-pressure system or, if reducing valve is installed, from above valve. Built in 2 standard sizes for any pressure and temperature conditions up to and including 1250 lb, 950 F. *Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.*

WATER TREATMENT — Micromet (sodium hexametaphosphate) is new "threshold" treatment for preventing scale in condensers and boiler-feed lines. Term threshold implies that the metaphosphate concentrations maintained are little more than traces—about 2 ppm. Treatment, therefore, is completely unlike traditional chemical treatment in which quantity of chemical used must be sufficient to convert mass of water impurities into other compounds. In boiler-feed water, threshold treatment is used as an auxiliary to other treatments, rather than as a replacement, to prevent secondary deposits of lime scale in and following softener. Micromet is said also to prevent lime deposits on trays of feedwater heaters and hot-process softeners, and to minimize scale formation in closed heaters at higher temperatures. Another application is to prevent lime-scale deposits on tubes of condensers, heat exchangers and cooling equipment, particularly where constant circulation of water (through cooling towers and ponds) result in loss of CO_2, higher temperatures, and concentrations that favor precipitation. Starting with clean condenser tubes, and using enough blowdown to prevent excessive concentrations of impurities, it is claimed that 2 ppm of Micromet will prevent all further deposits. With a once-through cooling-water system, Micromet feed must be continuous. With a recirculating system of large storage capacity, ' is practical to feed intermittently, or simply allow hexametaphosphate "glass" to dissolve gradually from a basket suspended in water. *Hagan Corp, Pittsburgh, Pa.*

CASTABLE REFRACTORIES—"Firecrete", for making special refractory shapes, and other similar applications, is suitable for working temperatures up to 2200 F. Has low heat-storage capacity, and is said to be four times as effective as brick in retarding heat, while having only half its weight. 65 lb required per cu ft of finished construction, and 24 hr after casting, is ready for service. *Johns-Manville, 22 E 40th St, New York, N. Y.*

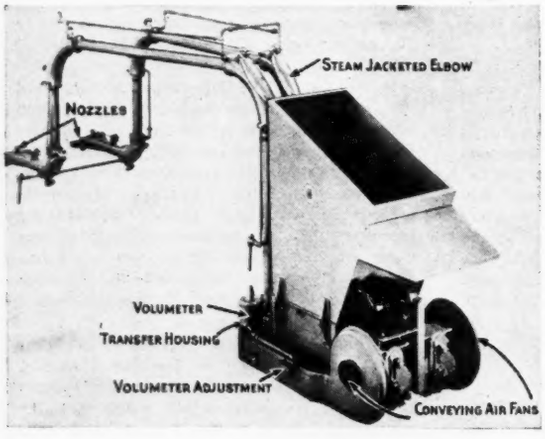
BYPASS CHEMICAL FEEDERS — Applicable either for treatment of boiler water or domestic water, feeders are available in capacities of 2 to 20 gal., and at maximum pressures of 150 and 300 lb. They are used to introduce chemical solution into water line either by shot feed, or proportional to rate of flow. Feeders can be supplied with variable-orifice valves and gage glass. *Milton Roy, 2031 E Madison St, Philadelphia, Pa.*

BOILER GASKETS—Two types of gaskets for manholes, handholes and tube caps of all standard types of boilers, made of steel, copper, Monel, etc, where surfaces are smooth. Asbestos and preformed metal strips wound spirally into round, oval, or irregular shapes compose irregular- urface gaskets. This second type available in plain or zinc-coated cold-rolled soft steel, and wide range of sizes. *Goetze Gasket & Packing Co, Inc, New Brunswick, N. J.*

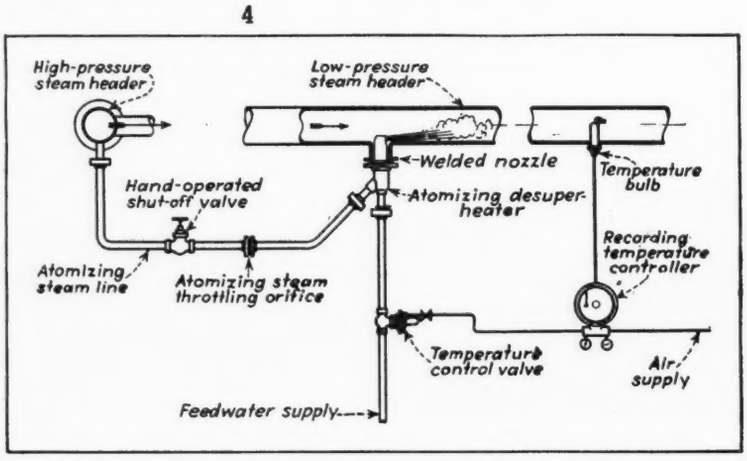
5 RING-TYPE CRUSHER—Triangular manganese steel sectors on crusher serve to minimize pulverizing of lumps. Unit cracks lumps instead of crushing them. Handles lumps of coal, peat, glass, limestone, steel turnings, slate, coke, gravel, etc, ranging in size from 6 to 26 in. Units available with or without apron fingers to remove unwanted materials. *Stephens-Adamson Mfg Co, Aurora, Ill.*

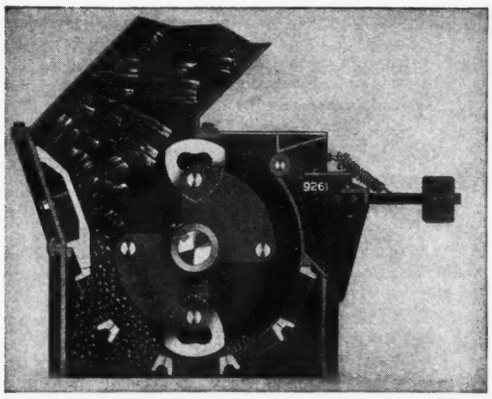
6 FIRE OBSERVER — Has wide opening or port covered on inside by shutter, with all infiltration of air eliminated. When shutter is raised, port is opened and colored Pyrex glass on outside diffuses glare and permits safe, clear vision of furnace. When handle is released,

3

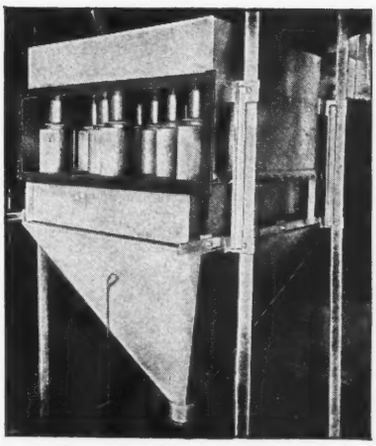


4

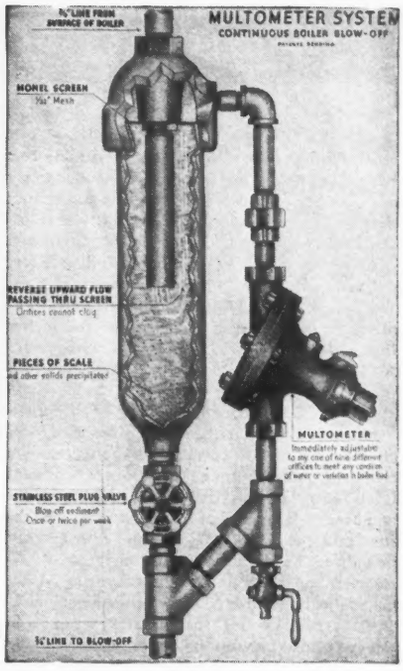




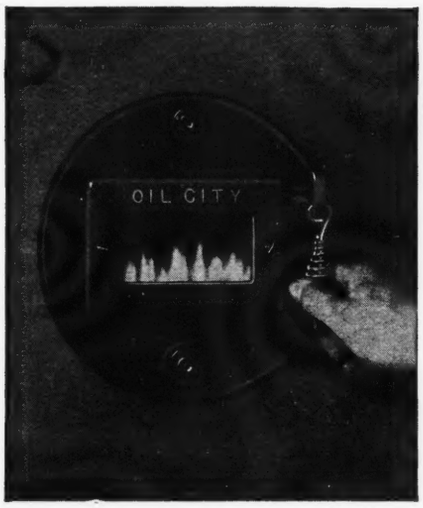
5



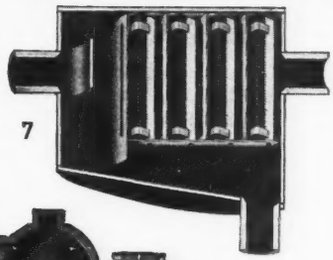
9



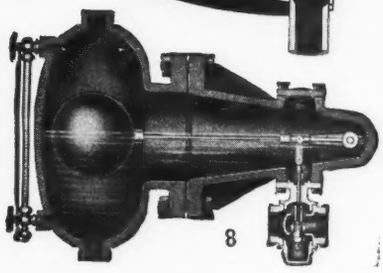
10



6



7



8

10 CONTINUOUS BOILER BLOWOFF—"Multometer" system consists of hollow cone with integral stem forged in one piece of stainless steel, precision ground and lapped into conical shell of malleable iron. When assembled, cone is held on seat by steel spring, and is made with one blank (or OFF) position, and 9 calibrated orifices, graduated in size to cover any range of flow. Adaptable for use on any boiler operating at pressures up to 250 lb, attached to side or rear of boiler. *P E Madden Co, Chicago, Ill.*

cover entirely closes port. Observer is equipped with Monel screen inserted on back of lens, which protects it when shutter is opened. *Oil City Tank & Boiler Co, Oil City, Pa.*

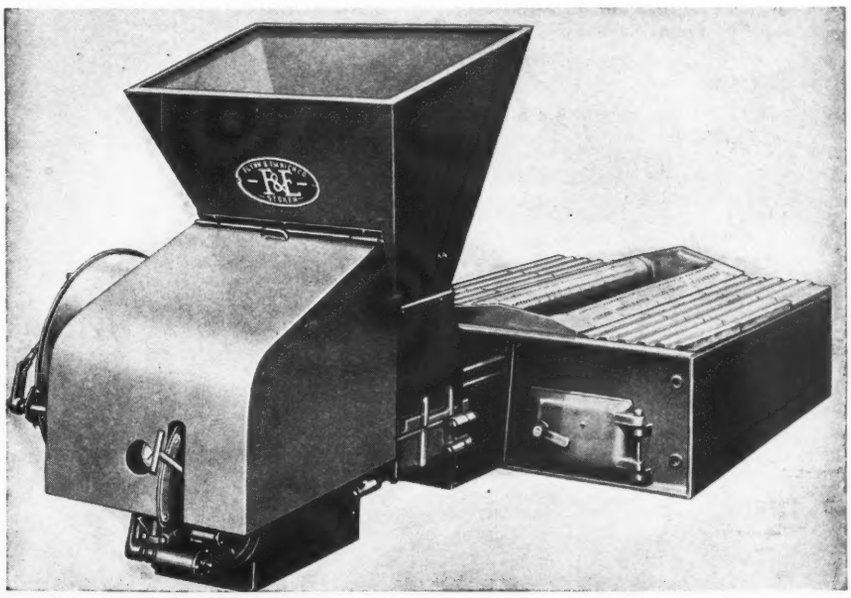
7 SCRUBBER UNIT—Line of "Master Scrubbers" has been expanded to include sizes of inlet-outlet pipes down to ⅛ in. Unit removes foreign matter as well as mist, fog and globular entrainment from steam, gas, air, etc, and is designed to be integral part of pipeline. Said to be compact, efficient and foolproof, and will work under any pressure or vacuum. *Master Separator & Valve Co, 607 S Hill St, Los Angeles, Calif.*

8 FEEDWATER REGULATOR—Mechanical, direct-feed operation of regulator said to eliminate delays in supplying makeup water. Boiler-water level required for safety reproduced in float chamber of regulator, and drop in level causes float-controlled feed valve to open in proportion to decrease in water level. Can be installed singly or in batteries, and can be adjusted to start or stop stokers and burners. *McAlear Mfg Co, Chicago, Ill.*

9 DUST COLLECTOR—"Thermix" tubular dust collector is series of steel tubes, each equipped with 2 slots in upper half, which in turn has directional vane on exterior of tube. Lower half of tube extends into dust hopper through tube sheet. Gas enters inlet plenum chamber and passes through slots in tubes, rotating around small tube. Central tube extends somewhat below bottom of slots in outer tube and upward to tube sheet which forms bottom of outlet duct. Dust is precipitated against sides of outer tubes and is carried down walls of tube into hopper. Cleaned gas is evacuated through smaller central tube to outlet duct. *Prat-Daniel Corp, Port Chester, N. Y.*

FLAME DETECTOR — This device consists of light-sensitive phototube within special air-cooled housing which is mounted on burner front or boiler wall, so that phototube "sees" flame at point where ignition begins to take place. As long as burner continues to maintain ignition, light from flame reacts on phototube, causing it to have low electrical resistance and thereby maintain a flow of current through amplifier in photo-electric relay. In case of flame failure, light to phototube is immediately reduced, since its line of sight is trained at point of ignition, where flame failures start. Without direct light from flame, phototube resistance increases and current flow in amplifier is reduced, with result that relay operates to close or open contacts for sounding alarm. Detector also shows "spotty" or "streaky" flame by fluttering of milliammeter. *Bailey Meter Co, 1050 Ivanhoe Rd, Cleveland.*

UNDERFEED STOKER—"F & E" Series 40 designed for heating boilers between 250 and 1000 sq ft heating surface. Adaptable to either bituminous or anthracite coal. Stoker is ram-feed powered by "electro-hydraulic" drive and has synchronized coal feed and air control. Full-length retort, combined with retort sliding bottom, provide underfeed action. Outside regulation of fuel bed while fire is burning is possible in event of change in size or quality of coal. Tuyeres made of high-test, heat-resisting materials. Mechanism and ram are protected from damage caused by tramp iron by device that stops operation of ram and permits removal of obstruction through door in ram case. Removable ram-case liner provides opportunity to replace at low cost part most subject to wear. Complete automatic controls standard equipment. *Flynn & Emrich Co, Baltimore, Md.*



COMPRESSORS

1 DIESEL-DRIVEN COMPRESSOR — Type XVO heavy-duty, diesel-driven assembly combines a horizontal, double-acting compressor with V-type, 4-cycle diesel in a compact unit that operates at moderate speed. Sizes are available for actual free-air-delivery rating of 625, 935 and 1250 cfm for 100-lb sea-level compression. Also, wide variety of air-, gas- and ammonia-compressing cylinders made for pressures from vacuum to 500 lb psi and higher. *Ingersoll-Rand Co, 11 Broadway, New York, N. Y.*

2 AIR COMPRESSORS—Line of improved units has these refinements: increased overall efficiency, 12% greater radiation area over cylinders, more thorough and positive constant-level oiling system, dust-proof crankcase, and non-breakable, cushioned discharge valves that are said to make operation quieter and smoother. When furnished for automatic stop-and-start operation, a loadless starting device automatically withholds all load from motor until it reaches full speed. Sizes range from 2.8- to 30.1-cfm piston displacement. Single-stage—single-cylinder, single-stage—duplex-cylinder, and 2-stage models are available in wide variety of mountings. *Quincy Compressor Co, Quincy, Ill.*

3 PORTABLE COMPRESSOR—Model 210A is air-cooled, 2-stage machine, newer models having I-R channel valves, which, it is claimed, make for more efficiency, cooler and quieter operation. Available in five sizes for capacities of 85, 105, 160, 210, and 315 cfm at 100 lb. Powered by either Waukesha heavy-duty industrial gasoline engines, or I-R Type H oil engines. Thermostatic control replaces adjustable curtain and air intake is now on top of roof. Bell housing connection is used on all models, and entire assembly is mounted on pressed-steel frame. *Ingersoll-Rand Co, 11 Broadway, New York, N. Y.*

4 COMPRESSOR—Type 30 ranges in size from ¾ to 15 hp. Utilizes "finger-valve" construction and is available with or without drive, receiver-mounted or bare. *Ingersoll-Rand Co, 11 Broadway, New York, N. Y.*

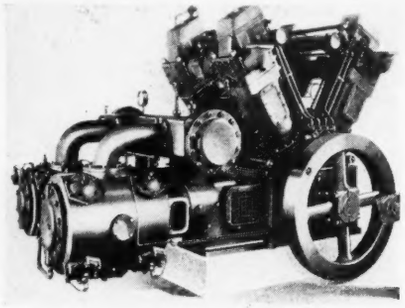
5 ODOR ADSORBER — Dorex adsorber for compressed-air pipelines is auxiliary air-stream filter of activated cocoanut-shell-carbon which absorbs odors up to 15-20% of its own weight. Reported to remove odors and vapors which cannot be stopped by condensers, separators or aftercoolers. Unit illustrated has capacity of 175 cfm. *W B Connor Engrg Corp, 114 East 32nd St, New York, N. Y.*

6 DIESEL-DRIVEN COMPRESSOR — Class W-CO unit consists of a double-acting, water-cooled compressor on common crankshaft and base with C-P heavy-duty diesel. Standard sizes of 2-stage units are available in capacities of 660 to 200 cfm for pressures of 80 to 125 lb; other sizes and types are made for lower and higher pressures. *Chicago Pneumatic Tool Co, 6 East 44th St, New York, N. Y.*

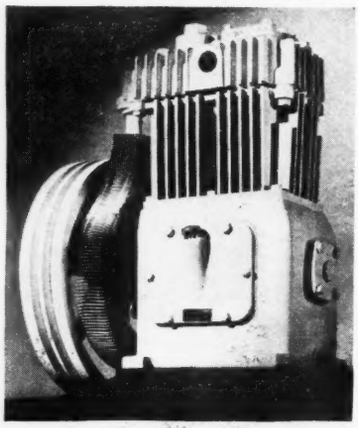
7 STARTING AIR COMPRESSOR—Type 20, vertical, stationary unit is built in four sizes from 7½- to 20-hp for piston displacements from 29 to 60 cfm at discharge pressures of 300 to 400 lb in heavy-duty service, and up to 1000 lb on intermittent starting service. Adaptable for starting stationary and marine diesels, and is available in variety of drives for connection to electric motor, gasoline or oil engine, flat or V-belt. Is water-cooled, automatically lubricated; minimum attention requirements claimed. *Ingersoll-Rand Co, 11 Broadway, New York, N. Y.*

8 MOTOR-DRIVEN COMPRESSORS—Larger, direct-connected, synchronous-motor-driven compressors feature "4-corner" construction of two low- and two high-pressure cylinders having single motor and single crankshaft. Incorporated in larger-size machines is force-feed lubrication and turret-type channel valves. Duplex units built in sizes from 600 to 800 hp, and 4-corner machines in sizes from 1800 to 3000 hp. *Ingersoll-Rand Co, 11 Broadway, New York, N. Y.*

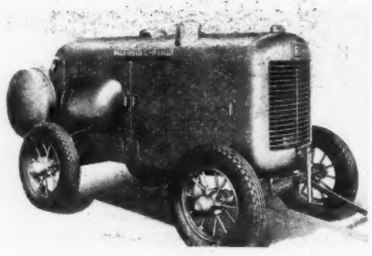
9 PORTABLE UNIT—Air compressor with power-takeoff drive for trucks consists of Worthington compressor driven through a multi-V-belt drive by a Hercules unit installed between truck transmission and front universal joint of propeller shaft. Compressor is 3-cyl, 2-stage radial air-cooled type on standard portable mounting and includes improved feather valves, ring-type fins, large sectional intercooler, force-feed lubrication and bypass unloading. *Worthington Pump & Machinery Corp, Harrison, N. J.*



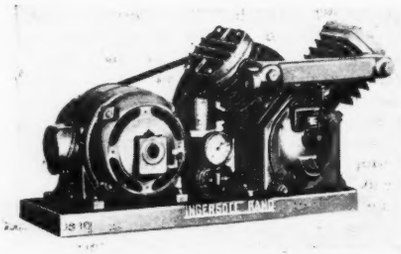
1



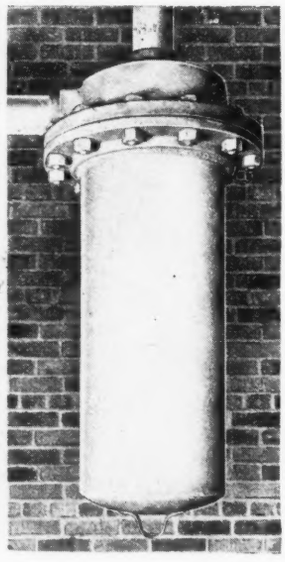
2



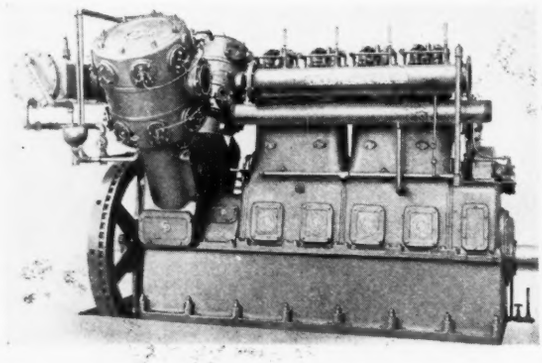
3



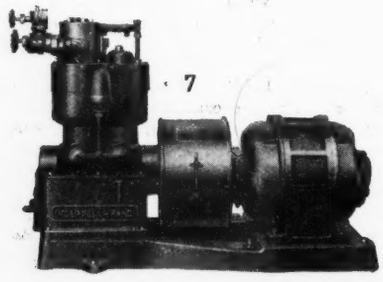
4



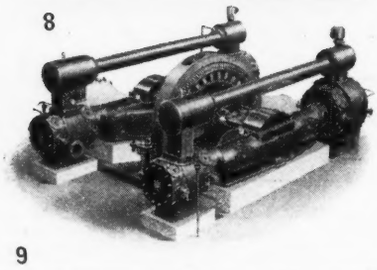
5



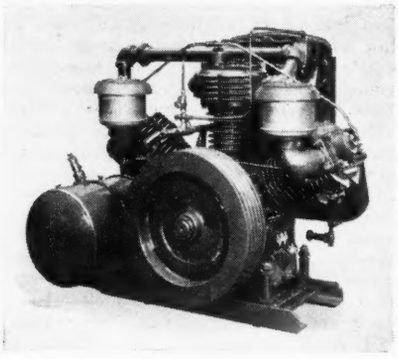
6



7



8



9

DIESELS, GAS ENGINES AND ACCESSORIES

1 ELECTRICALLY OPERATED ENGINE INDICATOR—Developed for designers and manufacturers of high-speed internal-combustion engines, this unit accurately measures rapidly changing cylinder pressure. Consists of a pressure unit, a cathode-ray oscillograph, an amplifier, and a synchronizer unit. Pressure unit converts rapidly changing pressures into electrical impulses which are amplified and pictured on screen of cathode-ray tube. Unit is unaffected by temperatures up to 350 C and is built to withstand pressures up to 5000 lb psi. Unit is not recommended for speeds slower than 1000 rpm. *RCA Mfg Co, Camden, N. J.*

2 EXHAUST SNUBBER AND SPARK ARRESTER—SDHS unit snubs charges of high-velocity exhaust gases that rush into exhaust pipe and bleeds same before noise can be made. Also prevents building up of line surges and peak back-pressures. Large cross-sectional patch reduces velocity of gases, and finer carbon particles are removed by centrifugal action to chamber in bottom of snubber. Unit works with all engines, but must be installed vertically. Available in 19 standard sizes with connections ranging from 2 to 30 in. in diameter. *Burgess Battery Co, Acoustic Div, 500 W Huron St, Chicago, Ill.*

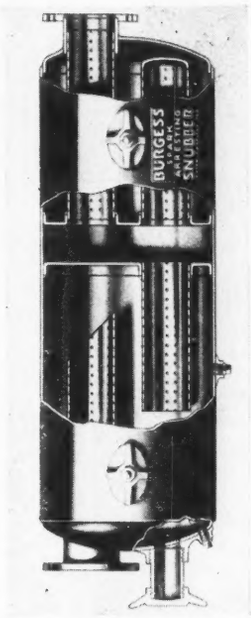
3 OIL RECLAIMER—Model B is smallest unit placed on market, but will still handle diesel installations up to 500 hp. Is direct-connected to lubricating systems of diesels. Is continuous-type oil purifier using absorbent clay which removes all contaminations such as acidity, carbon, sludge, abrasives, and restores favorable color. Unit is 17½x17½x38 in. *Hilliard Corp, 4 West 4th St, Elmira, N. Y.*

4 OIL FILTER—"Percolex" unit passes oil through six filtering agents: (1) perforated cartridge shell, (2) compressed waste, (3) water- and acid-absorbent earths, (4) second filter, (5) fabric filtering agent, and (6) fine-mesh metal screen. Made for all types internal-combustion engines, burning gas, gasoline or oil. Dust, dirt and sediment collected by filter dumped into sump below oil cartridge. *The Dushane Co, Inc, 1516 S Wabash Ave, Chicago, Ill.*

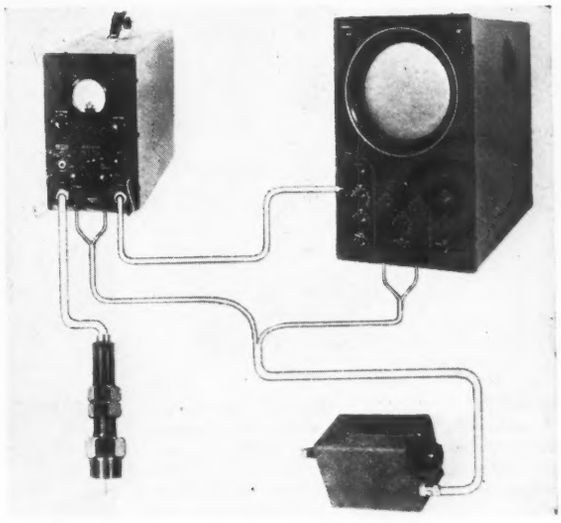
5 200-HP DIESEL—Model ME-650 has direct injection into plain symmetrical combustion chamber. Injector and fuel pump are combined into one unit which can be easily removed and reinstalled. Pistons are oil-cooled under pressure, which does away with need for special lubricants, and is said to eliminate ring trouble. There are four valves for each cylinder, assuring rapid scavenging and maximum breathing capacity. Is started by standard 24-volt battery, and can be had either as a bare engine or with radiator and full enclosure. *Murphy Diesel Co, Milwaukee, Wis.*

6 SILENCER - FILTER COMBINATION—"Protectomotor" Model DS silencer-filter combines radial-fin construction *C* and "Feltex" filtering medium *B*, with an effective sound-deadening series of rectifying tubes *A*. Models manufactured for engines of any capacity, threaded or flanged connections furnished on all standard pipe sizes. *Staynew Filter Corp, 25 Lexington Ave, Rochester, N. Y.*

7 POLY-CYCLE ENGINE—Multi-fuel engine built to burn oil, gasoline, butane, producer or natural gas, convertible by changing fuel-burning accessories. Engine is spark-ignition, spark plugs being carried in cylinder head. Engine illustrated has 6 cylinders, with 3-in., 7-bearing crankshaft, and output of 125 hp at 2100 rpm. When built as gasoline engine, elbow air horn at intake side is replaced with carburetor. *Waukesha Engine Co, Waukesha, Wis.*

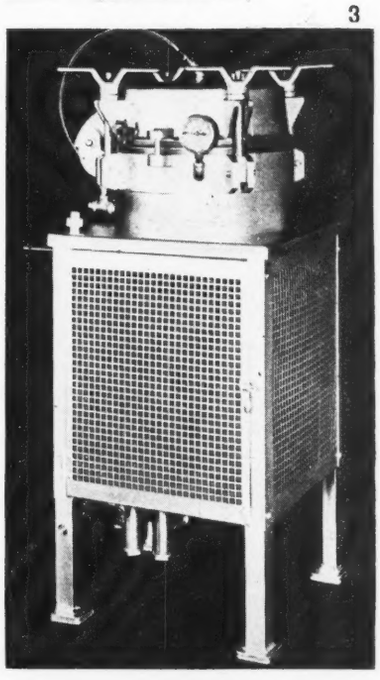


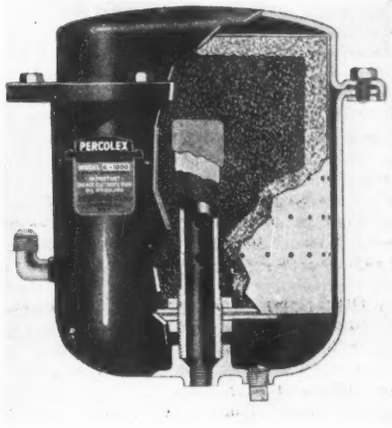
2



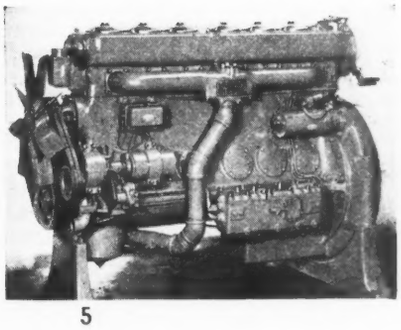
1

3

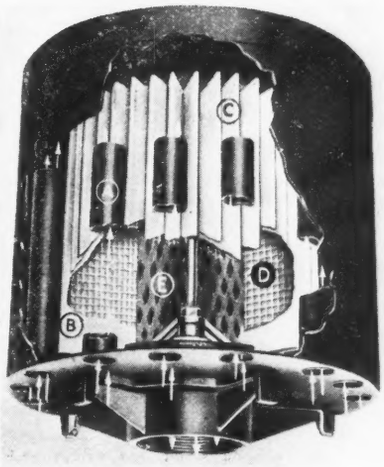




4

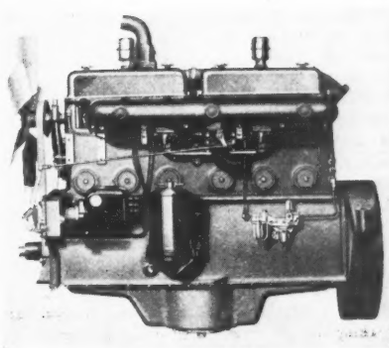


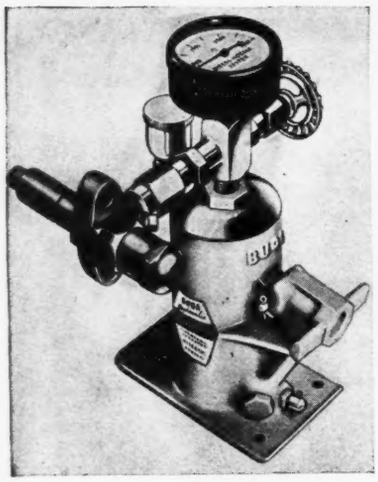
5



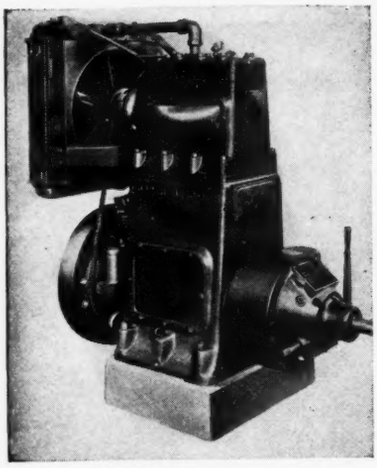
6

7

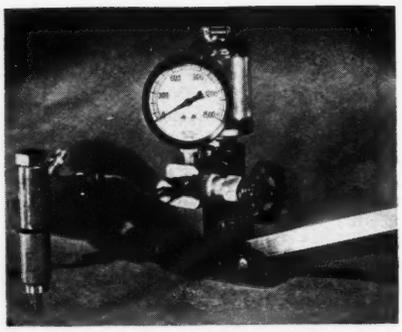




1

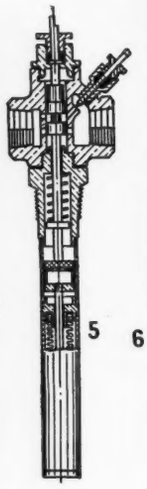


2

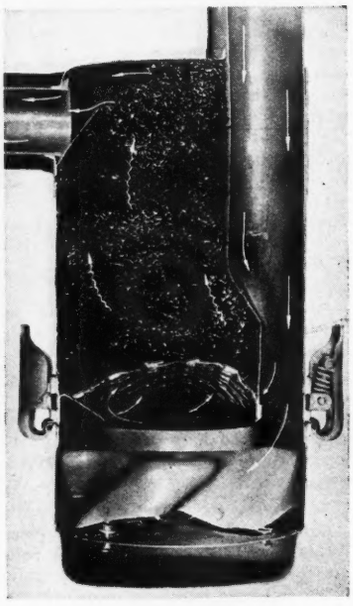


3

4



5



6

1 DIESEL NOZZLE TESTER — Hydraulic tester can be used to test and clean diesel fuel-injection nozzles made by Bosch, Timken and numerous others. Has oil capacity for testing 20 to 25 nozzles at one filling, and provision can be made to connect to oil-supply tank for continuous operation. Equipped with 2 adapters for specific type of nozzle, and can be secured to bench or packed in case for portable operation. *The Buda Co, Harvey, Ill.*

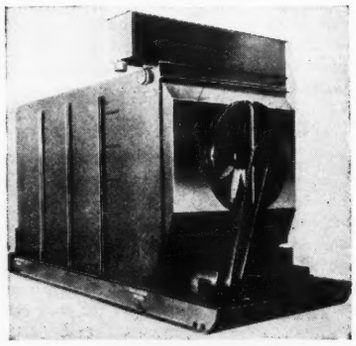
2 VERTICAL GAS PUMPING ENGINE—Type G-SC engine is rated 25 to 35 hp at speeds from 600 to 800 rpm. Is a 2-cyl, 2-cycle unit with bore of 5½ in. and stroke of 7 in. Over-all height is 4 ft 1¾ in., width 2 ft 6 in. and length with clutch 5 ft. It is started by hand or compressed air, and Meehanite metal is used for cast parts of the engine. *Cooper-Bessemer Corp, Mt. Vernon, Ohio.*

3 DIESEL-INJECTOR TESTER — Portable hand pump diesel fuel-injector-tester weighs but 6 lb, with handle 2 lb more. Tests injectors made by Deco, Hesselman, International, and others. Injectors can be tested without removal from engine block. Plunger, barrel, suction and delivery valve are identical with those in Deco fuel-injection pumps. *Diesel Equipment Corp, 4401 N Ravenswood Ave, Chicago, Ill.*

4 AIR FILTER—SILENCER—For applications where it is necessary to remove intake noises, but retain filtering qualities. Unit is available in two types, oil-bath and Unimaze. Silencing unit may be detached from one model, and is built integral in another. Both models have capacity from 0 to 4000 cfm. *Air Maze Corp, 5200 Harvard Ave, Cleveland, Ohio.*

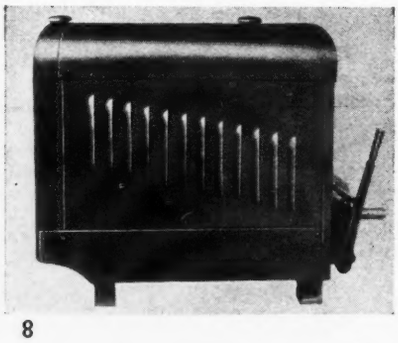
5 COOLING-WATER CONTROL — Type TR-40 for cooling-water jackets of internal-combustion engines and compressors, consists of a piston valve operated by a liquid-expansion thermostat to throttle flow of controlling water as required to maintain constant temperature. Valve has a bleeder port adjustable from outside, which allows a small amount of cooling water to flow at all times. This also keeps thermostat active and ready to respond. Innovation is a safety device, a fusible plug inserted between thermostat plunger and valve spindle in such a way that in event of thermostat failure, plug will collapse and water valve will be forced wide open. Sizes ⅜ to 1 in., inclusive. *Sarco Co, Inc, 183 Madison Ave, New York, N. Y.*

6 AIR CLEANER—Oil-bath air cleaner made so that air, as it enters cleaner, is made to whirl rapidly, producing vortex action and picking up oil from reservoir. Then sprays on impingement surfaces of vortex chamber, and into filter element, thoroughly washing it of dust. Oil drains from filter element carrying small amount of dust taken to oil reservoir. Air inlets of filter submerged in oil, so that oil is carried into filter element by first revolution of engine. Built in 2 types, for horizontal and vertical operation. *Vortox Mfg Co, Claremont, Calif.*



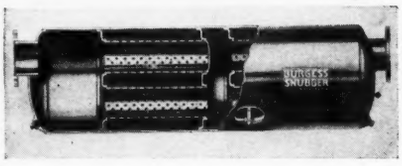
7

7 WATER-COOLING UNIT—Portable cooling unit for cooling jacket water of internal-combustion engines used for oil-field drilling and pumping. Only two connections to jacket-water system: inlet and outlet. Large raw-water tank stores more than enough water to feed cooling system at all times. Copper atmospheric tube sections easily accessible so that both exterior and interior surfaces can be cleaned when necessary. Raw-water pump driven by ac or dc motor, gas or gasoline engine, as desired. *The Marley Co, Fairfax Rd and Marley Ave, Kansas City, Kan.*



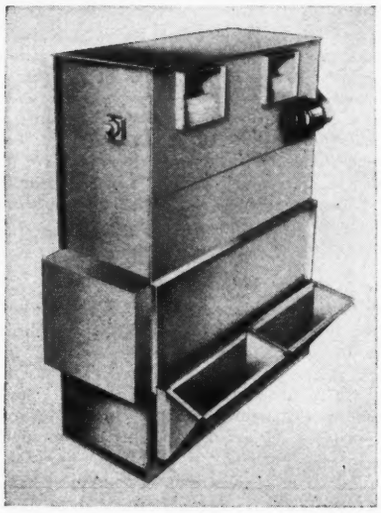
8

8 HEAVY-DUTY ENGINES — Model CW engines, designed for heavy-duty service, constructed with 1, 2, and 4 cylinders, rated from 2 to 22 hp. Have positive-drive gear oilers driven by crankshaft. Equipment includes electric starter, generator, water-circulating pump, fuel pump, lubricating-oil pump and filters, and combination carburetor for gaseous fuels and gasoline. *Novo Engine Co, Lansing, Mich.*

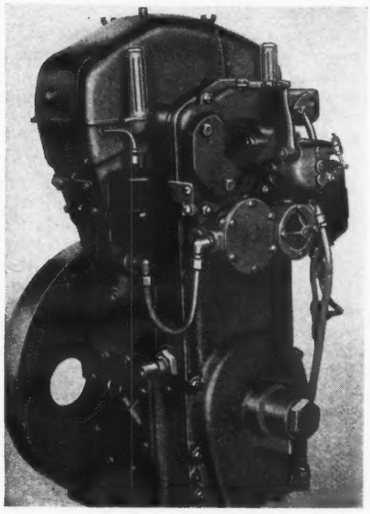


9

9 EXHAUST SILENCER—"Exhaust Snubber", for internal-combustion engines, was tested on a 1-cyl engine. Results said to be: pressure peaks at engine were reduced from 5 to 1¾ lb; there was no free oscillation of the column of exhaust gas; exhaust sound was a soft puff



10



11

and there were no further impacts to cause sustained tonal sound. As Snubber eliminates pressure waves in exhaust system, resonant conditions are never set up. Thus, it is possible to place Snubber at any point in system and to use exhaust-pipe length dictated only by architectural considerations. Also, device is claimed to be as effective on multi-cylinder engines as on single-cylinder units.

An addition to present line is new series, recently announced, known as SHDC Snubber. Covers a range of standard pipe sizes from 1 to 32 in. Both size and weight have been lowered by rearrangement of controlling parts. Another change is substitution of concentric connections for eccentric to facilitate installation. Sizes 1 to 4 in. have nipple connections, sizes 5 in. and larger have flange connections. *Burgess Battery Co, Dept NR, 500 W Huron St, Chicago, Ill.*

HIGH-SPEED ENGINE PRESSURE INDICATOR—For use in mapping diagrams of high-speed internal-combustion engines. Indicator, of balanced-diaphragm type, can be used at speeds up to 3000 rpm for pressures from 10 lb sq in. below atmospheric to 1500 lb sq in. above, and its accuracy is approximately that of a standard 6-in. Bourdon tube dial gage. Outfit consists of three parts: pressure-balancing instrument which is screwed into the opening in the engine cylinder as a spark plug; timing element, which is secured to a revolving part of the engine; and the coordinating measuring and recording apparatus located at any convenient place and connected to the indicator and timer with wires and flexible pressure tubes. *American Instrument Co, Silver Spring, Md.*

10 EVAPORATIVE COOLER—Trane cooler claimed to provide maximum efficiency in cooling jacket water, and to eliminate troubles usually encountered with open-type systems. Water used in unit is recirculated without any appreciable addition of makeup water. Under normal operating conditions, temperature of spray water is low so as to prevent precipitation and scale formation on outside of coil, but where hard or alkaline water is used, chemicals should be added. *Trane Co, La Crosse, Wis.*

11 V-TYPE DIESEL—Model 45-A made in 1- and 2-cyl sizes with capacities of 5 and 10 hp respectively at 1200 rpm. Is 4-cycle, solid-injection, with full pressure lubrication. Crankshaft is supported by Timken roller bearings. Crankpin bearings are precision type and Allen bronze piston-pin bearings are diamond bored. Has Bosch injection pumps with individual pintle-type injection nozzles. All models are hand started. *Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.*

DIESEL-ENGINE LUBRICATING OIL—"Rpm Delo" designed for all diesels regardless of size or design. Tests point out that oil is non-corrosive to alloy bearings, reduces wear of cylinders, pistons and rings, and prevents ring-sticking even under most severe operating conditions. Compounding material in oil is said to be resistant to oxidation and deterioration and stable in presence of moisture and in storage. *Standard Oil Co of Calif, San Francisco, Calif.*

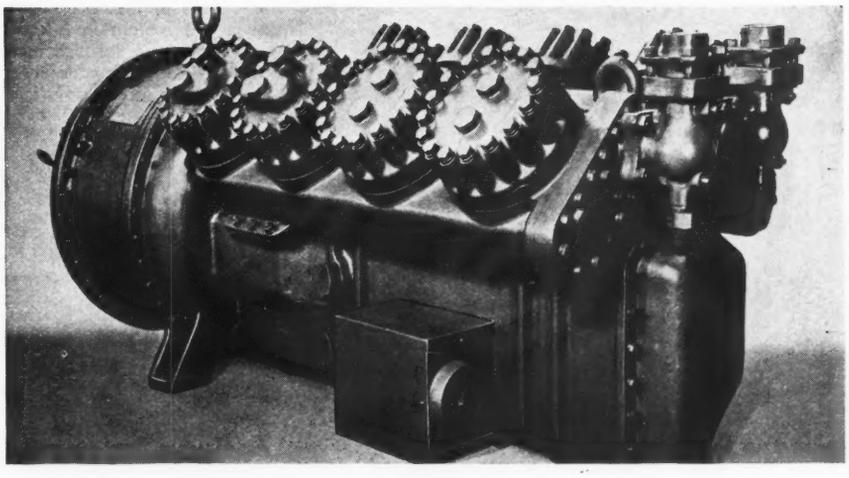
FUEL-OIL PURIFIER—"No-Sludge" is a dry powder composed of several refined chemicals, most important of which are specially processed napthalene crystals and gentle alkali. This substance is said to purify fuel oil by forming an electrolysis, holding sludge in suspension; napthalene crystals break up sludge in tank, and prevent more sludge from forming. Two other chemicals take care of moisture. Does not harm metal; will not explode or burn. One lb of No-Sludge treats 500 gal. of No. 4, 5 or 6 oil. *Dominion Chemical Co, 11 West 42nd St, New York, N. Y.*

DIESEL SILENCER—"Vortex Synchro-Silencer" is designed to synchronize correct silencing properties with all noise conditions, from initial explosion in combustion chamber to atmospheric discharge from tail pipe. Is similar to other commercial types in size and physical appearance. Manufacturer describes action of this muffler as a "stepping-down" process that can be likened to replacing a sharply vertical waterfall with a series of gentle slopes. Exhaust-gas impulses and sound waves are stepped down to discharge quietly without appreciable backpressure, change of direction or power-consuming obstructions. Made for all types of diesel engines from 75 hp up. *Engineer Specialties Co, Inc, 39 Cortland St, New York, N. Y.*

PISTON RINGS—Holland Piston Ring Co has taken over manufacturing equipment of Covert Mfg Co and Re-Nu Parts Corp, and is making a "Cast-Vent" segment ring claimed to be efficient in dealing with tapered and out-of-round cylinders. It has only one steel segment, which is on top of a deeply cut-away cast spacer. This design avoids forming an oil trap by elimination of lower land and facilitates returning of oil through holes under the ring to interior of piston and then to crankcase. Both segments are expanded by well-ventilated inner ring. *Holland Piston Ring Co, Holland, Mich.*

HEATING, VENTILATING, REFRIGERATION AND AIR CONDITIONING

1 HERMETICALLY SEALED REFRIGERATION COMPRESSOR—Compact, 100-ton, 16-cyl, 90-deg, V-type unit claimed to require but 1/3 the space as conventional compressors of same capacity. Also, said to be 12% more efficient than previous totally enclosed designs. Other advantages are refrigerant cooling for motor, sealed-in lubrication, and reversible oil pump to prevent harm when phases are inadvertently reversed on electric power system. Size has been reduced by using cold refrigerant gas returning from evaporator to cool driving motor, making it practical to tuck compressor in most readily available space without regard for adequate ventilation to carry away heat losses of motor. Normal rating of 100-ton unit is 1,212,000 Btu per hr, based on 37 lb psi suction pressure, 65-F suction gas, 75-F water in and 95-F water out. *Westinghouse Elect & Mfg Co, E Pittsburgh, Pa.*



2 EVAPORATIVE CONDENSER—150-ton unit used with large air-conditioning systems is completely waterproof for outdoor locations without protective covering or housing. For regions where water rates are high or where water pressures fluctuate. *Carrier Corp, Syracuse, N. Y.*

3 REFRIGERATION CONTROLS—Hydraulic action temperature controls utilize expansion characteristics of solid liquid charge which operates stainless-welded-steel diaphragm and enclosed switch with wiping contacts. Controls operate from —20 to +75 F. Device said to be immune to ordinary conditions of vibration. Switches enclosed to prevent entrance of dirt, and heavy load capacity is feature of all models. *Julien P Friez & Sons, Baltimore, Md.*

1 UNIT CONDITIONERS—Line of unit air conditioners can be installed quickly. Air is filtered and passed over cooling coils, which remove excess heat and moisture. Blower maintains circulation continuously, and draws fresh air as needed. Units available in capacities of 3 and 5 tons refrigeration. *Frick Co, Waynesboro, Pa.*

5 DUCT FAN—Made for duct systems, fan operates against static pressures up to 3 in. Furnished in single- and tandem-fan types. Single-fan capacities range from 1600 to 26,000 cfm, while capacities of tandem units run from 1600 to 30,000 cfm. Blades are drop-forged aluminum-alloy, non-sparking. *South Bend Air Products, Inc, South Bend, Ind.*

6 REFRIGERANT GAS PURGER—Unit removes air and incondensible gases from refrigerating systems using any common refrigerant except CO_2. Is connected to high-side receiver so it can take gas from top of receiver and just enough liquid from bottom of receiver to keep cooling jacket filled. When used as combination purger and expansion valve, unit is connected to bottom of condenser, taking liquid refrigerant as fast as it forms and discharging to low-side evaporator. Flow brings any air present into purger, where it is collected and discharged from upper chamber. *Armstrong Machine Works, Three Rivers, Mich.*

7 UNIT HEATER—Improvements in line of unit heaters include sound silencing, safety fan guard built into fan, and rust protection by Bonderizing process. Casing interior lined with accoustical mastic, and velocity generator evens flow through condenser and eliminates air-rush noise peaks. *Modine Mfg Co, Racine, Wis.*

8 UNIT HEATER—Projection unit heater now available with anemostat, originally designed for duct applications. Vertical air stream projected straight down from heaters ideal for anemostat distribution, enabling people to sit directly under unit, even on low-ceilinged installations. *Trane Co, La Crosse, Wis.*

9 AIR ELIMINATOR, AUTOMATIC BY-PASS—No. 10 high-pressure air eliminator is used for drying and automatic venting of unit heaters, pipe coils, dryers, etc, under steam pressures from 0 to 25 lb. Automatically bypasses extra condensation if it accumulates. Operating unit closes eliminator at 212 F and holds it closed until temperature drops below that point. *Gorton Heating Corp, Cranford, N. J.*

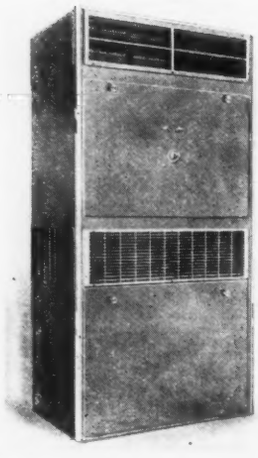
10 HEATER SECTION—Low resistance to air flow claimed to be outstanding advantage of heater section which may be operated by either steam or hot water for heating, and cold water or refrigerant for cooling. Constructed for finned copper tubes of hairpin design secured to headers by mechanical compression. Expansion and contraction is taken care of by shape of tubes, and although tubes are easily opened, method of attachment to headers is said to keep them permanently tight. *L J Wing Mfg Co, 154 W 14th St, New York, N. Y.*

11 THERMOSTAT—"Grad-U-Stat" has no leakport, and uses air only when changing position of an air motor or valve. Single model can be used as direct- or reverse-acting thermostat and throttling range of differential may be adjusted between comparatively wide limits. There is straight-line relation between temperature and air pressure in branch line between 0 and 15 lb compared to usual curve of leak-type thermostat, which usually permits graduation between 3 and 13 lb. *Minneapolis-Honeywell Regulator Co, 2950 4th Ave South, Minneapolis, Minn.*

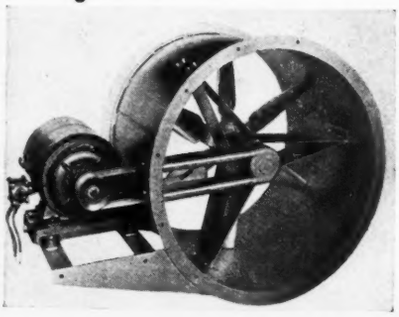
12 PLATE-TYPE EVAPORATOR—Unit, for freezing of ice to be accumulated or stored for use in storage refrigeration application for air conditioning, is constructed by using section of steel pipe or copper tube, *A*, 8 to 10 in. diameter, length of which is governed by evaporator capacity. In interior of evaporator, refrigerant is sprayed through nozzles of spray-nozzle manifold. Outside

2

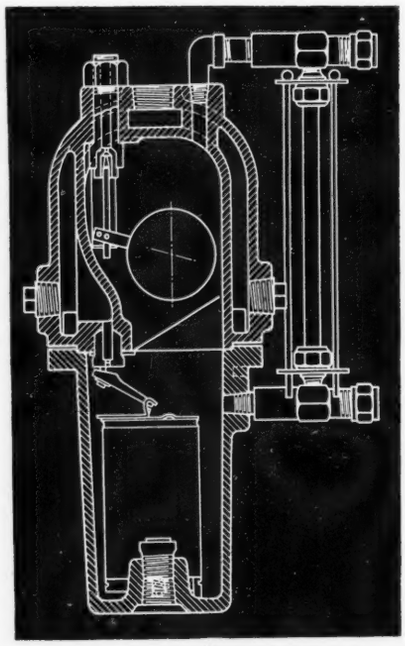
3



4



5

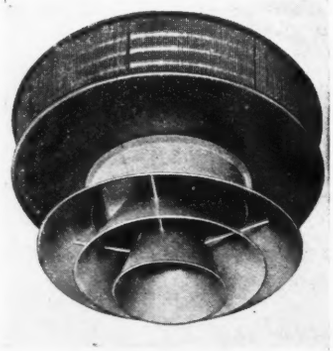


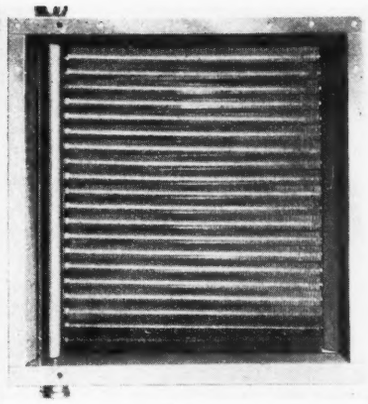
6

7

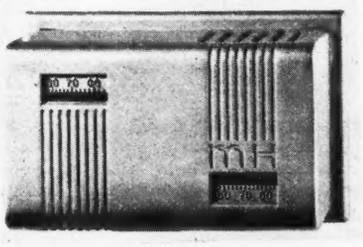
8

9



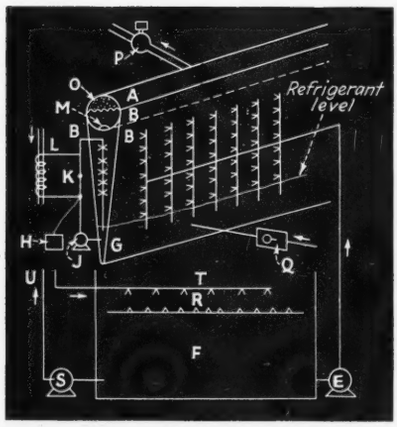


10

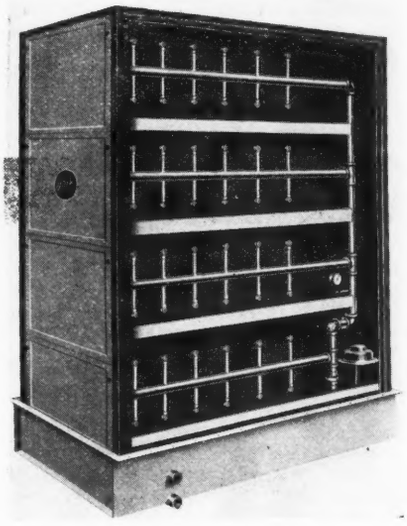


11

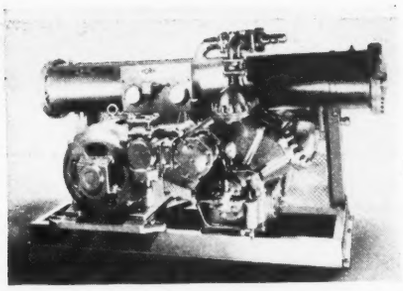
12



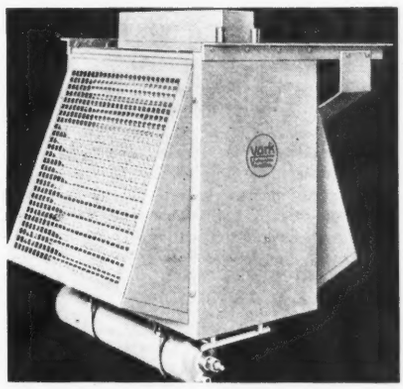
13



evaporator, along sides of plate, water is sprayed from nozzles of spray bank. Water is furnished these nozzles by circulating pump, *E*, drawing water out of insulated tank, *F*. Refrigerant is withdrawn from evaporator at *G* by special Freon pump *J* and is circulated over refrigerant spray bank. By circulating refrigerant through heat exchanger, it is warmed and warm refrigerant is sprayed against sides of evaporator, loosening sheet of ice, which falls to pointed grid *R*, which breaks ice into pieces and drops them into tank. *Carl Boester, 101 E Essex, Kirkwood, St. Louis, Mo.*



14



15

13 DEHUMIDIFIER—Type MC combines advantages of an air washer with flexibility of a dry finned-coil air-cooling unit. Combined effect of finned coils and water sprays said to result in efficient cooling and dehumidifying. Also has advantage of being able to cool air adiabatically as an air washer only, during periods of low wet bulb. Since it is built up with standard finned-coil sections and pannelled exterior casing, dehumidifier is easily shipped and speedily assembled on job. *York Ice Machinery Corp, York, Pa.*

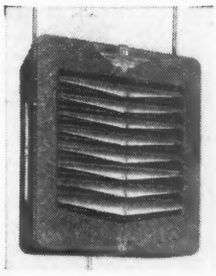
14 REFRIGERATING COMPRESSOR—W-Type is light in weight and can be installed on an ordinary upper floor and in locations where vibration might be a factor if special foundations were not provided. A 1-piece casting forms compressor crankcase and houses removable, nickel-iron cylinder sleeves which are assembled in 3 pairs. One pair is set vertically. Each of other 2 is set at an angle of 60 deg to first. Sizes from 40 to 75 hp. *York Ice Machinery Corp, York, Pa.*

15 CONDENSERS—Line of combination indoor cooling towers and water-cooled condensers permit operation with more than one compressor. Largest unit may operate with as many as four separate refrigerating circuits working simultaneously. This flexibility is obtained by providing separate coil sections within units which may be connected in parallel or separately, depending on needs. *York Ice Machinery Corp, York, Pa.*

16 PRESSURE FAN—"Axiflo" constructed to operate against wind or resistance of filters, baffles, etc. Blades pitched so that air delivery is not impaired regardless of fan location or velocity of opposing wind. Has mechanical efficiency of 79% and ability to overcome system resistance up to 1½ in. wg. *B F Sturtevant Co, Hyde Park, Mass.*

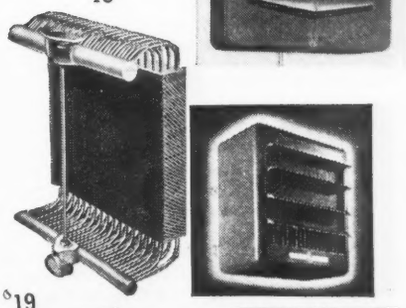
17 UNIT HEATER—"Thermolier" line now fitted with controls for both day and night temperatures. Heart of device is bulb-type thermostat containing full liquid charge, mounted within heater housing. Two pointers—one for day and one for night—are adjustable over 60-deg range and locked. Thereafter, day and night settings are made by pull cord hanging from heater. *Grinnell Co Inc, Providence, R. I.*

16

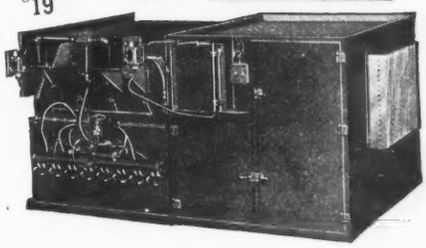


17

18



19



18 UNIT HEATER—New feature of propeller-fan-type hiJet heaters is patented "stay tube", built into heating element between supply and return headers to allow any entrained moisture, which might otherwise be carried over into heater, to drain directly from supply header to return header without entering other tubes of heating element. *Herman Nelson Corp, Moline, Ill.*

19 REFRIGERATION ECONOMIZER—"Refrig-O-Miser" stops compressor and utilizes outdoor air as cooling agent when air temperature is lower than desired indoor temperature, thus saving compressor power. In summer, unit cuts costs by high-velocity circulation, producing higher suction pressure at compressor. Built in wide range of sizes and types to fit various kinds of conditioning equipment. *U. S. Air Conditioning Corp, Graybar Bldg, New York, N. Y.*

HOSE, PACKING AND PAINTS

PLASTIC SEAL—"Cauxeal" said to retain plasticity indefinitely, and can be used for sealing water, fume, air or electrical conduits of metal, tile, or fibre; soil pipe, or glass block. Seal is applied by knife or by hand, after joint has been cleaned, and is said not to stick to hands or knife. Available in three consistencies: light, medium and heavy. *X-Pando Corp, 43-15 36th St, Long Island City, N. Y.*

BURST-PROOF STEAM HOSE—Improved hose, for saturated steam pressures up to 200 lb psi, or superheated steam to 390 F, has tube made from improved heat-resisting compound. On sizes 1¼ in. and larger, one ply of woven asbestos fabric and spiral wire reinforcement is placed between wire braids. In smaller sizes, braided asbestos is used to prevent kinking and collapse. Made in sizes from ⅜- to 2½-in. *B F Goodrich Co, Akron, Ohio.*

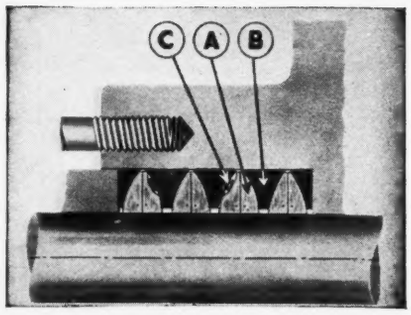
HIGH-PRESSURE SPRAY HOSE—800-lb hose is made of high-grade tube that is said to resist deteriorating influence of spray solutions. Composed of three braided plies of extra-wound yarn, and has cover of black abrasive-resisting stock. Available in sizes ⅜-, 7/16- and ½-in. inside diameter. *New York Belting & Packing Co, Passaic, N. J.*

STEEL SHIM STOCK—"Economy" kit contains rolled assortment of most frequently used thicknesses of thin steel shim stock packed in carton. Thicknesses from .001, .002, .003, .005 in., can be pulled through slot in carton and cut off in desired lengths. *Laminated Shim Co, 21-44 44th Ave, Long Island City, N. Y.*

ALUMINUM PAINT—Ready-mixed paint can be applied directly from container. Consists of 59.5% Gilsonite asphalt and tung-oil base with fine aluminum paste. Tests point out that ready-mixed formula is equal to regular paint in durability. *American Asphalt Paint Co, 43 E Ohio St, Chicago, Ill.*

HEAT-RESISTANT COATINGS — "Thur-Ma-Lox" coating protects metal over a range of temperatures from ordinary conditions to 1800 F, depending on type used. Coatings produced in black or aluminum. May be applied by brush or spray, and claimed resistant to corrosion and wear. *Thurmalox Co, 3109 N Broad St, Philadelphia, Pa.*

ROD PACKINGS—Long-service rod packing employs two metal rings (see illustration, *A*), convex on one face and flat on other, as sealing medium, on shaft. For some applications, these rings are made of special babbitt metal, while for others, a metal that will resist heat up to 700 F is used. Between these sets of rings are rings of Neoprene, *B*, which are concave on both faces so that they will mate with convex surfaces of metal rings. Beryllium copper springs, *C*, are imbedded in rubber or Neoprene rings. These springs seat themselves in recesses in metal rings and have a two fold purpose. When packing is in use on centrifugal units, they prevent it turning with rod. On reciprocating rods, springs are so placed that they exert an inward and downward pressure to offset any irregularity of rod. Springs also compensate for low follower heads and any up-and-down motion or sidesway. *Rodpak Mfg Co, San Francisco, Calif.*



RESURFACER—"Por-Lox", designed for concrete tile, is made up of Por-Lox waterproofing, and Por-Lox colored, weatherproof and sun-resistant coating for application over waterproofing material. Waterproofing soaks into concrete and bars all moisture. Color coat bonds securely to first coat. *Truscon Laboratories, Detroit, Mich.*

NO-RUST PRIMER—"Valdura" primer, made from tung oil and other sealing oils, is said to choke rust and prevents its spreading or bleeding through top coat of paint. Manufacturer believes that any high-grade paint can be satisfactorily applied over this primer, thus eliminating need for sandblasting or cleaning rusty surfaces before painting. *American Asphalt Paint Co, 43 E Ohio St, Chicago, Ill.*

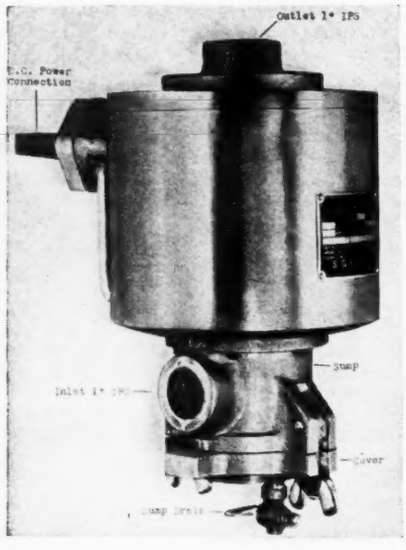
CORROSION-RESISTANT COATINGS—"In-Hib-Co" introduces chrom glucosate compounds for corrosion control into new fields. Prepared in several forms, and can be applied by spreading, spraying or brushing on exposed surfaces. *D W Haering & Co, Inc, 2308 S Winchester Ave, Chicago, Ill.*

FLEXIBLE HOSE—Improved air hose uses synthetic rubber in tube or lining. This is said to give protection against deterioration of lining in handling hot oil. Better method of bonding cord carcass to tube results in greater adhesion. Is also claimed to have greater ability to resist internal pressure as well as external punishment, and to be easier to handle because of increased flexibility and because of smaller outside hose diameter. *New York Belting & Packing Co, Passaic, N. J.*

PROTECTIVE COATING—Dampney No. 2 is for application to interior of liquid-, gas- or air-contact surfaces of metal tanks, shells, containers, pressure vessels, etc, where temperature of water or solutions is not over 220 F at any point. Is resistant to oxygen, acids, alkalies, chlorides, sulphides, oils, fats and alcohol solutions. High dielectric strength prevents electrochemical corrosion. Covering power is 300 sq ft per gal., single coat. *The Dampney Co of America, Hyde Park, Boston, Mass.*

PROTECTIVE COATINGS—"Densochlor" is chlorinated rubber coating designed to give high resistance to corrosive influences, alkalis and practically all acids. Also, "Densocrete", a rubberized enamel, is designed to meet exacting requirements of a concrete-floor covering. Its resistance to oils, greases, abrasion, etc, and ease with which it can be kept clean, is said to make this coating very suitable for boiler-room floors. Manufacturer cautions that before applying Densocrete, concrete floor must be thoroughly cleaned and then possibly etched with 10% solution muriatic acid. *Densol Paint Co, Independence, Ohio.*

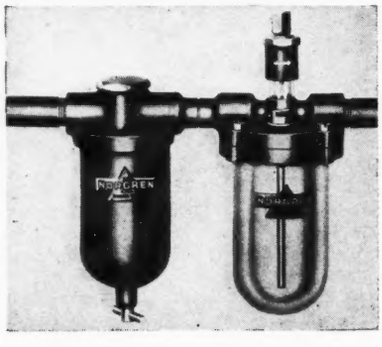
ALUMINUM PAINT—"Fence-Bond" is ready-mixed aluminum paint made for painting rusted chain link or any other rusted surface, without removing rust. Base oils are penetrating, creeping onto all joints and contact points, sealing rust against further corrosive action. *Skybryte Co, Cleveland, Ohio.*



LUBRICATING EQUIPMENT

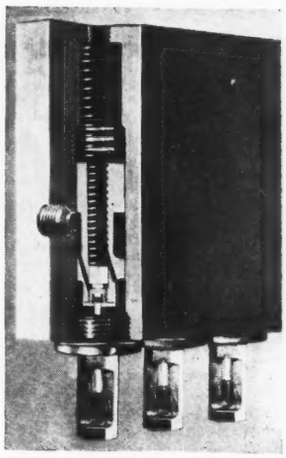
OIL FILTER—"Ferro-Filter", said to remove particles of iron from lube oil up to 1/25,000 in., operates on magnetic principle. Consists of set of screens set in a stack, highly magnetized and enclosed in a casing. Screens have mesh openings about ⅛-in., which offer little resistance to oil flow, and said to be non-clogging. Dirt is retained on screen until demagnetized and cleaned. Cleaning is done by washing in gasoline, and no fillers or other replacement parts are necessary. Low pressure-drop through filter claimed to be outstanding feature. *S G Frantz Co, 161 Grand St, New York, N. Y.*

1 AIR-LINE LUBRICATOR AND STRAINER —A combination of two devices, air strainer and sight-feed lubricator, is designed to condition air for air tools. Strainer consists of double-screen bronze head, and drawn-steel tin-dipped bowl. A 200-mesh Monel screen is sup-



2

3



4

ported by a 100-mesh brass screen. Lubricator follows in general patented design of standard Norgren lubricators, with added feature of transparent oil reservoir of resilient plastic, which, it is claimed, will not chip, stain or shatter. Made in ¼-, ⅜- and ½-in. sizes for horizontal lines. *C A Norgren Co, Inc, Denver, Colo.*

2 LUBRICATING SYSTEM — "Lubriflush" system of lubricating motor bearings eliminates old lubricant. Through duct leading from outside of motor, new lubricant is injected to inner side of bearing with pressure gun. Drain is placed on opposite side of bearing underneath, and as new lubricant is injected, old lubricant is forced out. Before new lubricant reaches outlet, it must flush entire bearing. Outlet can be closed when new lubricant begins to show. *U. S. Electrical Motors Co, Los Angeles, Calif.*

3 CONSTANT-LEVEL OILER—Visible, automatic, constant-level oilers have unbreakable reservoirs and adjustable oil-level features. One filling of reservoir said to lubricate bearing three months or longer. Reservoir attached to lower casting by threaded spout easily removed for refilling or cleaning. Available in 1-, 2-, 4- and 8-oz capacities with all bottles interchangeable. Two styles for standard and high-surge levels have side outlets only, and bottom outlets for bottom connection or for draining purposes. *Trico Fuse Mfg Co, Milwaukee, Wis.*

4 LUBRICATING SYSTEM—Model H unit for cranes and auxiliary equipment is a manually operated pumping unit for use with new Model H measuring valve. Pumps holds 8 lb of grease and can be filled with hand, or by a portable grease pump through a fitting. Double-acting pistons reduce time cycle of operation, and a detachable handle is a safety precaution against tampering or excessive operation. Illustration shows 3-valve block, cut away to reveal construction of one valve chamber. *Blaw-Knox Co, Gordon Lubricators Division, Pittsburgh, Pa.*

ABSORBENT OIL FILTER—Improved design has more filtering surface, bypass relief valve in same container and easier access to insert or remove filtering medium. Material is stuffed into removable lattice metal cage, and dirt waste is shaken out of cage after center core is removed. Filter may be installed horizontally or at an angle. In pressure-lubricating systems, oil in circulation is piped to and from filter, about 1/6 to ¼ of circulated oil passes through filtering medium and balance is shunted through relief bypass valve in filter. *W W Nugent & Co, 402 N Hermitage Ave, Chicago, Ill.*

PRESSURE FEED LUBRICATION SYSTEM—"Unilube" system is integral and compact, furnishing lubricant under pressure to bearings or gear meshing points. It provides in a single-unit full feed pressure filtration and automatic temperature and pressure control of lubricant supply. Units designed and sizes and types to meet numerous lubrication applications. Adapted to plants using reduction gears, large motors, and other force-feed-lubricated machinery. *De Laval Separator Co, 165 Broadway, New York, N. Y.*

UNBREAKABLE GRAVITY FEED OILER—Line of streamlined oilers with unbreakable reservoirs is mounted on top of part to be lubricated and any predetermined number of drops of oil per minute can be obtained by simple adjustment of ratchet control. After desired adjustment has been made, no further attention is required except to keep reserve supply of oil in bottle. Oiler is 50% lighter in weight than previous models and there are no gaskets to leak. *Trico Fuse Mfg Co, Milwaukee, Wis.*

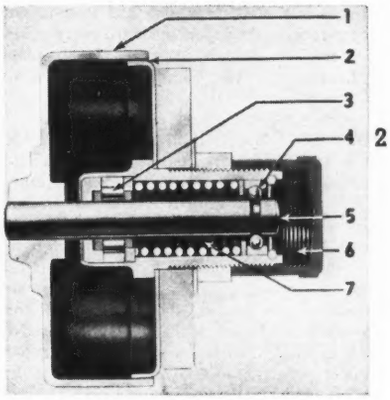
MECHANICAL TRANSMISSION AND MATERIALS HANDLING

1 VARIABLE-SPEED TRANSMISSION — "Variducer" is an infinitely variable-speed-reduction transmission incorporating planetary-gear transmission for speed reduction and differential-gear for adjustable-speed control. Sun gear of planetary system is on input shaft, and planet gears are connected to output shaft as in conventional planetary reduction gear. Around the planetary gears is a ring gear that meshes with planet gears on inside and on outside with a pinion on a jack shaft. Ring gear, supported in a casing on two bearings, can be rotated. Other end of jack shaft connects by V-belt to main shaft. Both V-sheaves are fixed to their shafts but their pitch diameter can be adjusted to vary speed of jack shaft and therefore that of ring gear. *B F Perkins & Son, Inc, Holyoke, Mass.*

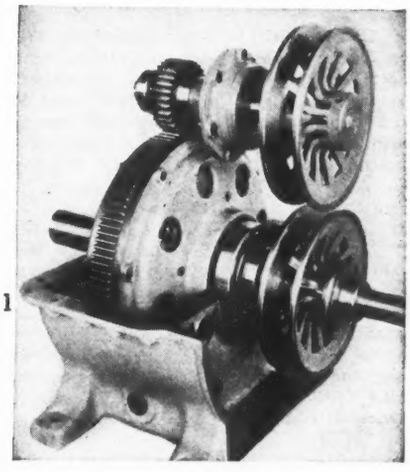
2 IDLER PULLEY—Ball- and roller-bearing pulley consists of balanced standard or special pulley (1) provided with dust-proof cover (2), which eliminates all abrasive dust from heavy-duty bearing (3) and stabilizing ball bearing (4). Bearings run directly on hardened chrome-steel shaft (5). Grease cup (6) provides for measured amount of grease every second year of operation, and large reservoir (7) is filled at factory to last first 2 years. Five standard sizes with over-all lengths up to 3 1/16 in. *S K F Industries, Inc, Philadelphia, Pa.*

3 BEARING SEAL—Triple seal, for protecting bearings against lubricant leakage, dust, dirt, etc, consists of two split rings on each side of housing and grooved on outside diameter to form a labyrinth seal with two end bores of housing. Each ring has inward tension that enables it to turn with shaft. On either side of housing, two rings are mounted in shaft with splits 180 deg apart to prevent lubricant leakage through splits. Inner ring serves as internal flinger, and outer ring keeps dirt and other foreign matter from entering housing. Made for complete range of standard shaft sizes. *S K F Industries, Inc, Philadelphia, Pa.*

BEARING SEAL—"Hurtt" seal operates in similar fashion as tunnel caissons, where compressed air prevents leaks. Low-pressure air is introduced from blower or other air supply between two seals, one facing lubricant supply and one facing coolant supply, making barrier

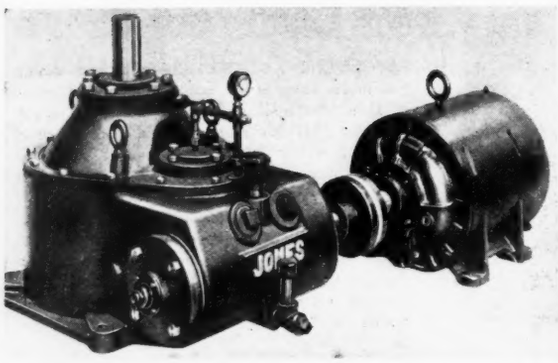


2

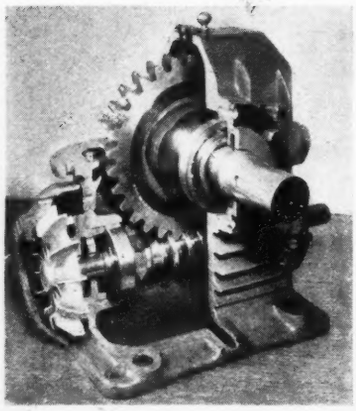


1

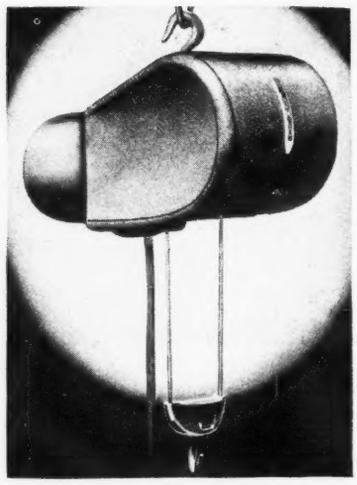
3



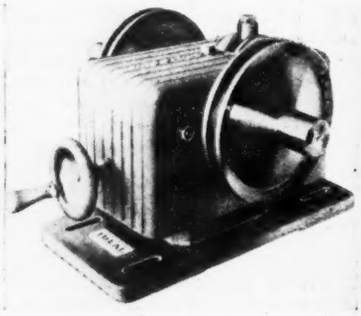
1



6

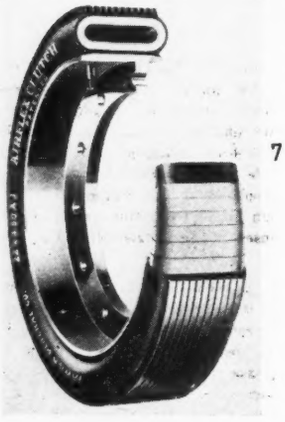


9

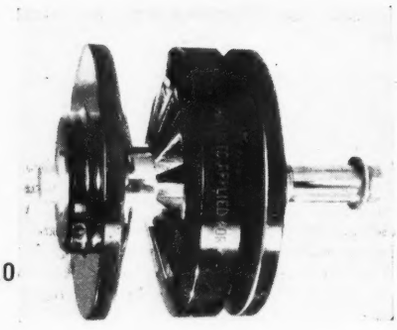


2

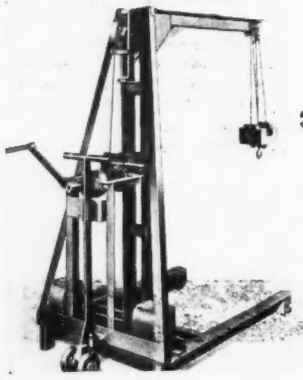
4



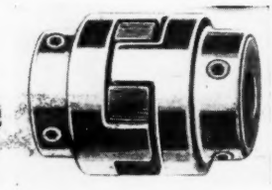
7



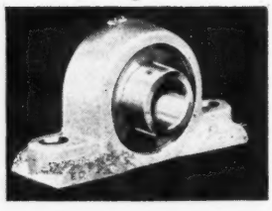
10



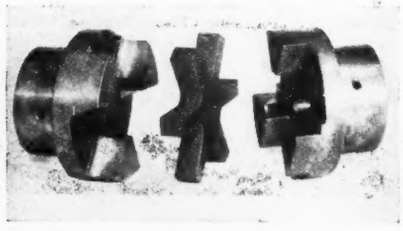
3



5



8



11

which opposes entrance of dirt or loss of lubricant. *W T Hurtt, 871 Graham Blvd, Wilkinsburg, Pa.*

1 SPEED REDUCER—Worm-helical speed reducers developed for vertical shaft drive where large reduction in speed is required. Available in 15 standard ratios from about 40 to 1 to approximately 250 to 1 for all common motor speeds and hp ratings. *W A Jones Foundry & Machine Co, 4401 Roosevelt Rd, Chicago, Ill.*

2 HANDWHEEL CONTROL — "Select - O - Speed" transmissions built with handwheel control permit finer adjustments of speeds, partial turns of wheel changing speed. Models supplement standard line from fractional to 7½-hp capacity which are equipped with hand lever control. By replacing hand wheel with beveled gears and extension rod, control may be remote. *Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.*

3 SHOP CRANE—Portable shop crane, either electrically or manually operated, is of welded steel, with capacities from 500 to 5000 lb, with either fixed or revolving boom. Boom uprights can be made rigid, upright, hinged or telescoping to negotiate low overhead clearances or doorways. *Barrett-Cravens Co, 3255 W 30th St, Chicago, Ill.*

4 VARIABLE-SPEED TRANSMISSION — PIV units now come in two new sizes, No. 0, ½-hp, for speed ratios of 2 or 3 to 1; and No. ½, 1½-hp, for ratios of 2, 3 or 4 to 1. Can be furnished for horizontal mounting, motorized or without integral motor, and with or without extra speed-reduction sets. *Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.*

5 FLEXIBLE COUPLING—Type 1-A safety flexible coupling for handling misalignment, starting torque, and absorbing shock, etc, on direct-connected machinery, has body made of tobin bronze that will not spark under any conditions. Spider or resilient load cushion is made from rubber, duck, leather or a brake-lining material of woven asbestos. 3-piece construction (2 tobin bronze flanges and 1-piece cushion spider) makes assembly and installation quick and easy. Made in standard sizes with bores from 1 to 2¼ in., 2 to 80 hp at 1750 rpm. *Lovejoy Flexible Coupling Co, Chicago, Ill.*

6 FORCED-AIR - COOLED WORM - GEAR UNITS—Forced-air cooling system dissipates heat from gear case and permits greater capacity from given unit size, compared with conventional designs. Worm shaft is supported by two radial ball bearings that take both radial and thrust loads. Gear-wheel shaft is similarly supported by radial ball bearings, an additional roller bearing being provided for heavy overhung loads. Made for ratios of 5-1 to 60-1 in single reductions and 60-1 to 3000-1 in double reductions. *Thomas Prosser & Son, 120 Wall St, New York, N. Y.*

7 RUBBER CLUTCH—"Airflex" clutch uses same principle as certain automobile tires, that of narrow vanes or ribs of rubber, compressed into snakelike form, under pressure, providing adhesion to steel and other materials. Capacity of clutch regulated by internal pressure, while outside is given special treatment to prevent deterioration by oil fumes. *Fawick General Co, Akron, Ohio.*

8 PILLOW BLOCK—"Series ED" consists of specially designed single-row bearings in die-cast housing, assembled to provide shaft deflection and misalignment up to 1 deg. Neoprene seals claimed to eliminate friction and increase life of seals and bearings. Standard shaft sizes are ½, ⅝, ¾, 15/16, 1, 1⅛, and 1 13/16 in. *Ahlberg Bearing Co, Chicago, Ill.*

9 ELECTRIC HOIST—"Torpedo" hoist can be used on hook, lug or trolley suspension, is fully enclosed and has standard pushbutton control. Comes equipped with double cast-iron drums, with right- and left-hand machined grooves, and full lift obtained with overlap of cable on drums. Available in capacities from 250 to 1000 lb. *Conco Engineering Works, Mendota, Ill.*

10 VARIABLE-SPEED PULLEY — Improved "Speedmaster" variable-speed pulley is made in two sizes: 3½-in. diameter for drives up to ½-hp capacity and a 6½-in. diameter for drives up to 3 hp. Interposed between motor and driven unit, position of pulley can

be changed to vary center distance of speed-master pulley in relation to drive and driven sheaves. Belts thus assume smaller or larger operating pitch diameters through action of variable-pulley surfaces. *Continental Machine Specialties, Inc, 1301 Washington Ave S, Minneapolis, Minn.*

11 FLEXIBLE COUPLING—"Bondtru" unit has been improved to give larger hp ratings and larger maximum bores. Two metal flanges having projecting segments engage each other through a non-metallic insert, arms of which carry load in compression. Five intermediate sizes of coupling have been redesigned to employ inserts with six radiating arms, providing 3 driving points of contact, instead of former 4-arm insert which provided only 2 points of contact. *Charles Bond Co, Philadelphia, Pa.*

12 FLANGE UNIT — "Sealmaster" flange unit claimed to be only self-aligning bearing unit with seals built as integral part of bearing proper, independent of housing. Misalignment cannot interfere with effectiveness of seal, according to manufacturer, for even though bearing is removed from housing, dirt cannot enter bearing. *Stephens-Adamson Mfg Co, Aurora, Ill.*

13 VIBRATORY FEEDER—Model F-0 feeder is rated at capacity of handling as much as 2000 lb per hr of 100-lb material, and is intended for small, finely controlled feeds of few lb per hr. Feeder is made of sheet-metal trough 18 in. long by 3 in. wide, with tapered sides from rear to front, mounted on springs and actuated by pulsating electromagnet. *Syntron Co, 492 Lexington Ave, Homer City, Pa.*

14 HYDRAULIC CONTROL—Control provides automatic speed regulation to make possible synchronization of different machines, or separate sections of single machine. Control is mounted at one end of transmission frame and self-contained hydraulic power-plant is mounted on right-hand set of shifting levers of transmission, which control disk and belt diameters. Plant consists of small electric motor operating oil pump in reservoir to supply hydraulic power. *Reeves Pulley Co, Columbus, Ind.*

15 MAGNETIC CLUTCH—Type ED multiple-disk magnetic clutch is designed to operate as two clutches, both magnetically energized by single magnet. By a duplex arrangement, unit can be operated in either direction simultaneously. To conserve space, collector rings are carried on outside diameter, one collector ring being common to both magnetic coils. *Stearns Magnetic Mfg Co, Milwaukee, Wis.*

16 BELT IDLERS—Series 43 belt idlers have self-cleaning bases, and support brackets are assembled in jigs to assure proper spacing. Slight adjustments possible by slotted holes in mounting plates. Rolls are machine-faced on ends and pressed onto shoulders of cast roll ends, which have been rounded to avoid injury to belt. Grease tube provided from one bearing to other, and anti-friction bearings protected with labyrinth grease seals. *C O Bartlett & Snow Co, Cleveland, Ohio.*

17 CENTRIFUGAL CLUTCH — D-E automatic centrifugal clutch consists of two main parts: housing drum, and expansion body. Steel cover plate, held in position by lock ring, seals clutch mechanism against dust, etc. Expansion body consists of 6 metal segments interconnected by tension springs and operated on individual posts extending radially from driving hub. *Dawes Equipment Inc, 2280 Penobscot Bldg, Detroit, Mich.*

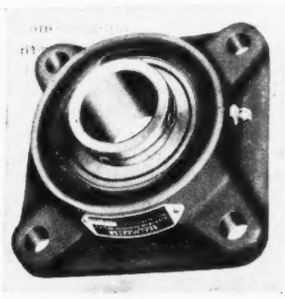
18 PILLOW BLOCK—Lightweight, patented pillow block consists of three parts. Is said to have increased oil capacity and full constant self-alignment. Available in shaft sizes from ½ in. to 1 in., and can be mounted in any position. *Randall Graphite Products Corp, 609 W Lake St, Chicago, Ill.*

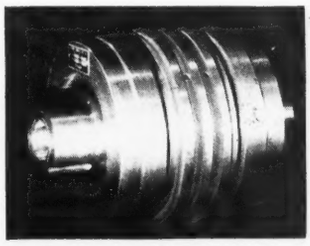
19 FLEXIBLE COUPLING—"Morflex" coupling uses specially shaped rubber trunnion bushings to provide effective flexing medium for withstanding shock loads and absorbing vibration. In radial type, bushings are assembled radially, equally spaced on steel pins of yoke member. Two-piece metal housing encases rubber bushings, and provides for bolting companion flange. Capacities range from 2 to 37 hp at 100 rpm. *Morse Chain Co, Ithaca, N. Y.*

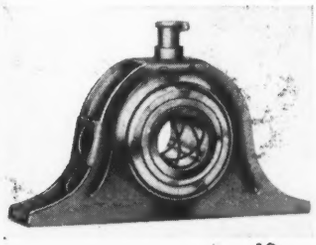
20 MOTOR BASE—"Ideal" base holds belt drive taut through spring tension. Covers any type drive, horizontal, vertical or overhead, and operates with any load, pulsating, steady or reversing. To take up slack from normal wear and stretch, adjusting screws are turned. Spring tension holds motor, takes up slack, and cushions load shock. *Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.*

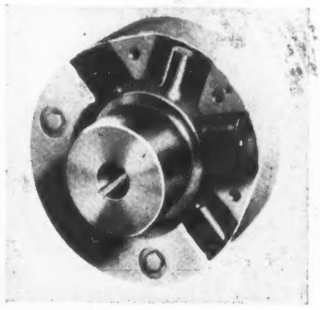
21 RUBBER-BUSHING FLEXIBLE COUPLING—Developed from the conventional steel-pin and rubber-bushing flexible coupling, "Cone-Ring" coupling differs from it in the manner that rubber is used to obtain greater flexibility. Instead of a 1-piece bushing on each pin, bushings are made of several rings having conical sections. These permit rubber to deform more freely in all directions, giving increased axial, angular and torsional flexibility, in a coupling of given dimensions. Construction also provides greater freedom for endwise motion to accommodate end float of line-shafts. *Thomas Prosser & Son, 120 Wall St, New York, N. Y.*

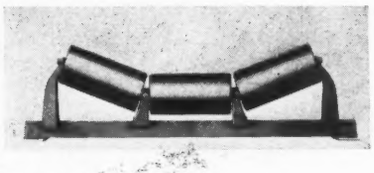
V-BELT FASTENERS—"Alligator", for *B, C* and *D* section V-belts, used only on crosswoven fabric V-belts and should not be used to shorten or repair stretched-out or broken endless-cord V-belts. With these fasteners, it is possible to install and maintain matched lengths of V-belts on multiple drives without necessity of tearing down drive installation. *Flexible Steel Lacing Co, 4607 Lexington St, Chicago, Ill.*

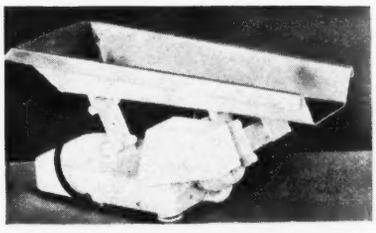

12


15

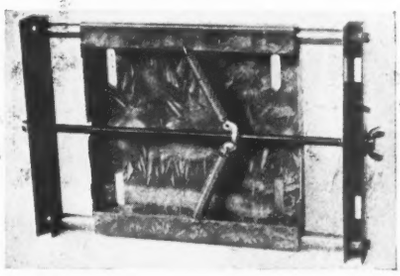

18

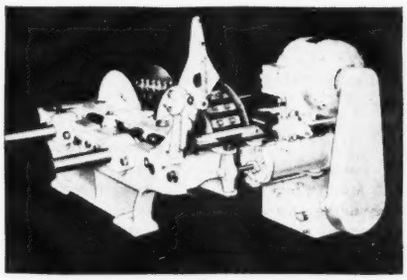

19

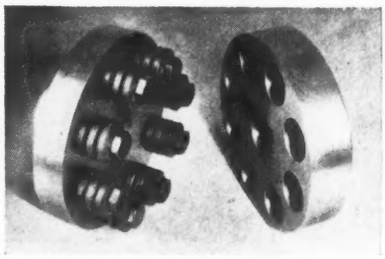

16

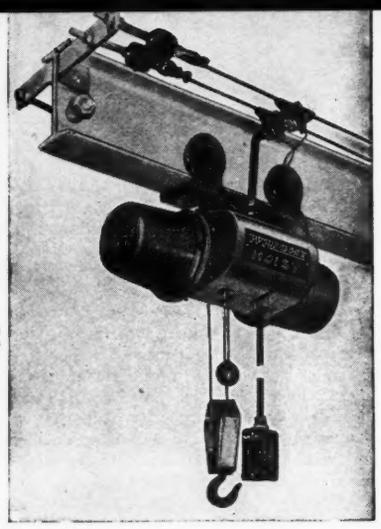

13

17

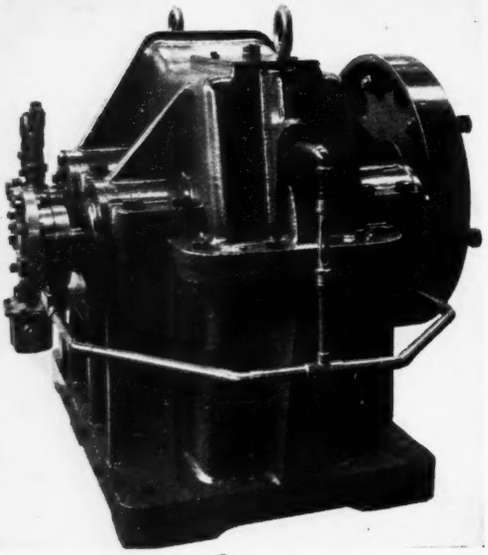

20


14

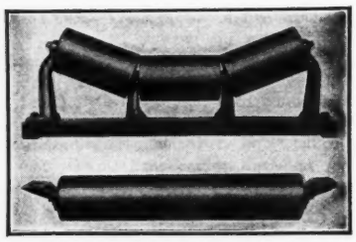

21



1

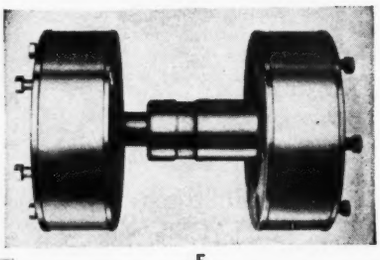


2

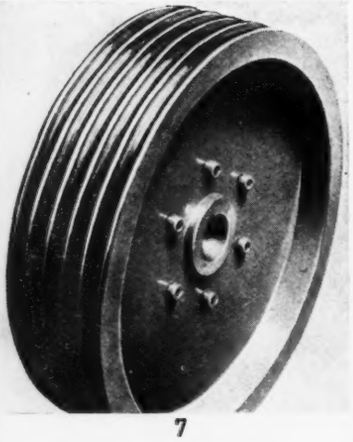


3

4

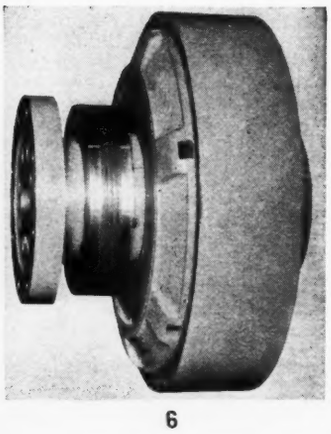


5

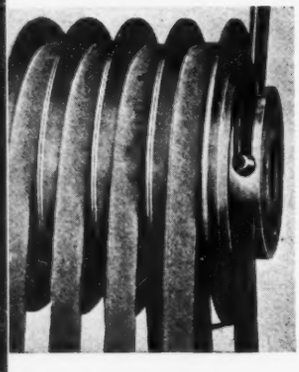


7

8

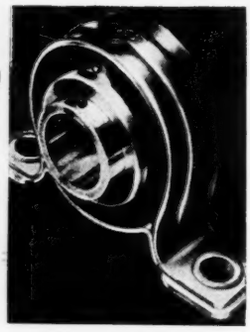


6

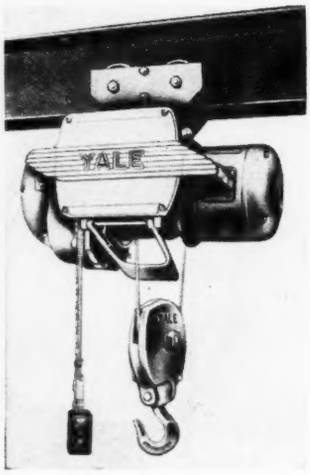


11

12



10



9

1 ELECTRIC HOIST — "Speedway", lightweight, low-cost, wire-rope electric hoist has capacities from 250 lb to 750 lb and speeds 15 to 43 fpm. Standard construction includes fully enclosed ball-bearing motor, anti-friction bearings, cut-alloy-steel spur gears, multiple-disk solenoid brake, pushbutton control, preformed hoisting cable. Made in three types: for lug suspension, hook suspension or mounting on trolley. *Wright Mfg Div, American Chain & Cable Co Inc, York, Pa.*

2 SPEED REDUCER—Type SU available in standard gear ratios of from 2 to 1 to 12 to 1, and in ratings of 1 hp per 1000 rpm of high-speed shaft to more than 1800 hp per 1000 rpm. Can be supplied for either right- or left-hand assembly. Gears are spray lubricated at line of contact; all bearings are under pressure lubrication. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

3 TROUGHING AND RETURN IDLER — Roller-bearing idlers have malleable-iron supporting brackets of streamlined design and crescent section, said to give maximum strength. Has new triple-seal assembly claimed to prevent escape of grease or entrance of dirt, grease or moisture, and patented, single-shot lubricating system. Troughing-idler shaft-and-pulley assembly can be completely dismantled and reassembled without tools. *Robins Conveying Belt Co, 15 Park Row, New York, N. Y.*

4 VARIABLE-SPEED DRIVE UNIT — With capacities up to 80,000 lb torque and infinitely variable-speed ranges of 310 rpm forward to -9 rpm reverse (with any standard 1- to 10-hp motor), this drive unit is available for either right- or left-hand installation and with either vertical or horizontal output shafts. Wide range of speeds, variable to a fraction of an rpm by turning control handle, is obtained by combination of standard variable-speed transmission driven by motor in turn driving conventional speed-reducer gearing. *Mechanical Handling Systems Inc, 4700 Nancy Ave, Detroit, Mich.*

5 FLEXIBLE-COUPLING DRIVE-SHAFT UNITS—"Morflex" radial-coupling units consist of two standard Morflex couplings with a slip-joint drive shaft between, for drives requiring greater flexibility than can be accommodated with a single coupling. Slip joint is full-spline construction, grease tight, and slides freely under load. Shaft assembly is balanced for smooth operation. Available in ratings of 2 to 27 hp at 100 rpm. *Morse Chain Co, Ithaca, N.Y.*

6 MAGNETIC CLUTCH — Style F clutch, illustrated, and Style FF magnetic clutch-brake will fit into small space, and speed of operation can be timed to exacting conditions. Applicable to flywheel or shaft. Said to be readily accessible for adjustment and lining replacement when necessary. Made in variety of sizes and combinations. *Stearns Magnetic Mfg Co, Milwaukee, Wis.*

7 RIM-TYPE SHEAVES — Line of Texrope demountable rim-type sheaves has been extended to certain sizes carried in stock and a range of sizes which can be made promptly to order. They consist of a substantial bushing on which may be mounted sheave rim of desired number of grooves and pitch diameter. Rim is fastened to hub by six cap screws, providing easy and convenient way of changing sheaves without removing hub from shaft. *Allis-Chalmers Mfg Co, Milwaukee, Wis.*

8 ROLLER CHAIN—In this round-pin roller chain, diagonal channels are rolled into stock from which bushing is made. When joint is assembled, channels appear as spiral grooves and extend through side plates of bushing link. Channels not only act as reservoirs but as paths

for flow of oil through side plates and down to pins, where lubricant is seized and spread by capillary action in a protective film over entire contact surfaces of pins and bushings. *Morse Chain Co, Ithaca, N.Y.*

9 ELECTRIC HOIST—Principal new development of "Cable King" electric hoist is air cooling. Fins, simulating a Sirocco blower, are cast in brake drum in line of air stream. As load is lowered, fins revolve to produce air circulation and cooling action that forces a constant flow of cool air around brake and gear housing. Thus, said to be able to perform on heavier duty cycle than other hoists in same class. Either ac or dc; capacities from ¼ to 6 tons. *Yale & Towne Mfg Co, Philadelphia, Pa.*

10 PILLOW BLOCK—"Rubber Flex" pillow block comprises a self-locking bearing that is inherently aligning, and which is encased in pressed-steel housing equipped with felt seals to exclude dirt. Bearing and housing are surrounded with elastic material having sound-absorbing characteristics, and material has been specially treated to make it impervious to oil and grease. *S K F Industries Inc, Philadelphia, Pa.*

11 ADJUSTABLE PULLEY—"Wedgbelt" pulley said to eliminate noisy operation and time-taking adjustments, and to provide many speed adjustments between maximum and minimum pulley diameters. On *A* groove, maximum speed changes range from 22 to 33%; *B* groove, 18 to 25%; *C* groove, 15 to 20%. By use of adjustable pulleys on both motor and shaft, greater ratios of speed can be obtained. Side walls of pulley move in or out simultaneously and are said to produce perfect belt alignment which is maintained at fast or slow speeds. *American Pulley Co, Philadelphia, Pa.*

12 RETURN IDLER—"Rubberdisc" return idler said to be ideal for use on any conveyor belt which handles abrasive, corrosive, damp, or sticky materials. Constructed of steel tube shaft on which are mounted series of resilient rubber disks, spaced about 6 in. apart, except at the ends, where last two are about 3 in. apart. Within steel tube are "lubricated-for-life" bearings, needing no greasing or oiling, and sealed against entrance of dirt or moisture. Idler is self-cleaning, and slight deflection of disks provides belt cleaner. *Robins Conveying Belt Co, 15 Park Row, New York, N. Y.*

GEAR-CHAIN HOIST—"Power Master" has controlled gravity loading by clutch and governors. Load may be stopped at fractional part of an inch. Other features include lubrisealed ball bearings, with planetary gear system sealed and running in oil. Built in capacities ranging from 1 to 8 tons, with unit weight as low as 86 lb for 1-ton, 169 lb for 8-ton. *Coffing Hoist Co, Danville, Ill.*

NEOPRENE TRANSMISSION BELT — Built to withstand destructive action of mineral oils, "Duroil Hewprene" is made of Neoprene synthetic materials. Friction and skin coat protect cotton duck against wear, ply separation and softening from oil at high temperatures. *Hewitt Rubber Corp, Buffalo, N. Y.*

FLEXIBLE COUPLING — Equalized rubber-cushioning compressed drive is feature of 4R coupling. Differs from standard coupling in that it has seamless-steel ring moulded around outer extensions of rubber lugs, thus enclosing rubber into compression chamber. Oil-resistant rubber or Neoprene spider used between coupling halves has lugs concave curved, which mate with convex-curved surfaces in lugs on coupling halves, giving uniform compression on insert. *Certified Flexible Coupling Co, 122 East 42nd St, New York, N.Y.*

SOUND-INSULATED PILLOW BLOCK — Series EDR said to be completely insulated by molded cushion of Neoprene, and is applicable to light service, such as domestic air-conditioning units, fans, etc., where silent operation is necessary. Seals, of floating construction, are also Neoprene. Provision made for normal misalignment, and bearing is electrically grounded. Shaft sizes are ½, ⅝, ¾, 15-16, and 1 in. *Ahlberg Bearing Co, 3025 W 47th St, Chicago, Ill.*

BALL-BEARING IDLER—Type B-304 designed for handling materials of medium weight. Suitable for conveyor widths of 14 to 30 in. inclusive, has idler rolls made from 4-in. smooth-finished steel tubing with formed heads pressed into and welded to each end. Heads ball-bearing equipped and sealed against dust and dirt by combination labyrinth and composition seal. Troughing-idler rolls supported in ribbed brackets of unbreakable malleable iron, in turn carried on an inverted angle base said to be self-cleaning. *Chain Belt Co, Milwaukee.*

BELT CUTTER — "Universal" cutter handles leather, fabric and rubber belts up to 8-in. width. Holds belt securely against side guide, while special knife is drawn down track to assure even cut. May be carried to job or bolted to bench. Blade can be sharpened or replaced. *Armstrong-Bray Co, Chicago, Ill.*

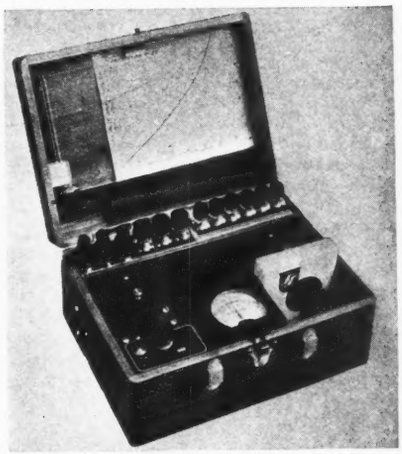
METERS AND INSTRUMENTS

1 WATER ANALYZER — "Nalco Phototester" operates on principle that current which flows in circuit containing a photoelectric cell is proportional to the illumination which cell receives. Any method of analysis which allows either chemical precipitation or development of a depth of color is proportion to presence of constituent being determined, can be adapted to tester. Unit designed as portable instrument and its current is supplied by single dry cell. May also be connected to 6-volt storage battery or 6-volt belt-ringing transformer using ac current. *National Aluminate Corp, 6216 W 66th Place, Chicago, Ill.*

2 FREQUENCY CONTROLLER — "Micromax" controller combines in one case Micromax frequency indicator and recorder, with an automatic controller. Recorder requires roll of chart and ink every two weeks, with lubrication and cleaning twice yearly. *Leeds & Northrup Co, 4907 Stenton Ave, Philadelphia, Pa.*

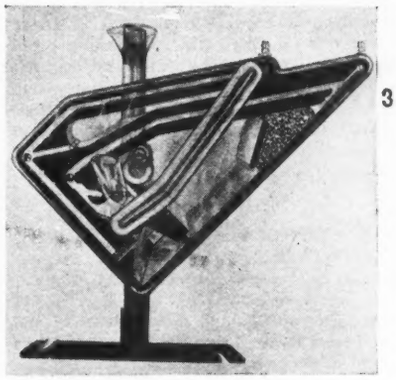
3 FLUE-GAS ANALYZER—"Orsatomat" employs principle of volumetric measurement and chemical absorption. In operation, operator pulls out small rod that protrudes from side of case, aspirates gas into unit by small rubber bulb, and pushes rod in. Percentage of CO_2 is shown on dial at front of case. As rod is pushed in, it tilts pivoted unit causing a column of mercury to flow by gravity to push trapped gas sample into absorption chamber where CO_2 is instantly absorbed. This causes sample to shrink, creating vacuum which works on sensitive bellows connected to dial pointer. *Hays Corp, Michigan City, Ind.*

4 pH METER—Flow-type electrode assembly of pH meter can be incorporated in piping to give direct measurement of pH fluctuations on process solutions. Consists of porcelain-enamel flow chamber with standard 1-in. inlet and ¾-in. outlet pipe connections. Electrodes and temperature-compensating thermometer are



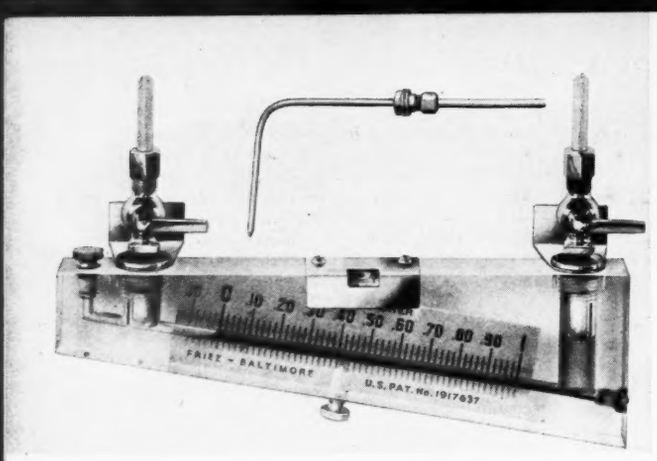
1

2

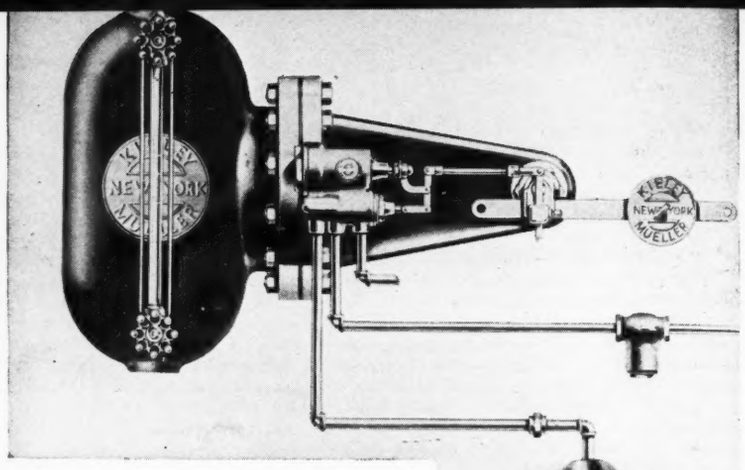


3

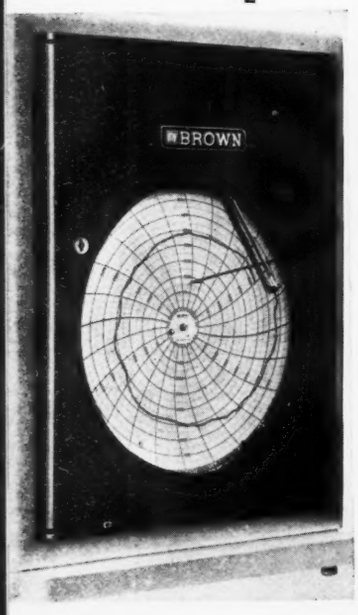
4



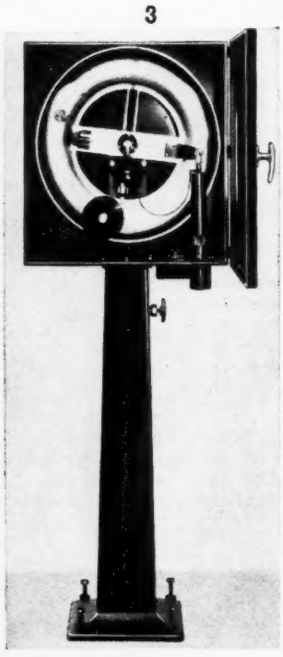
1

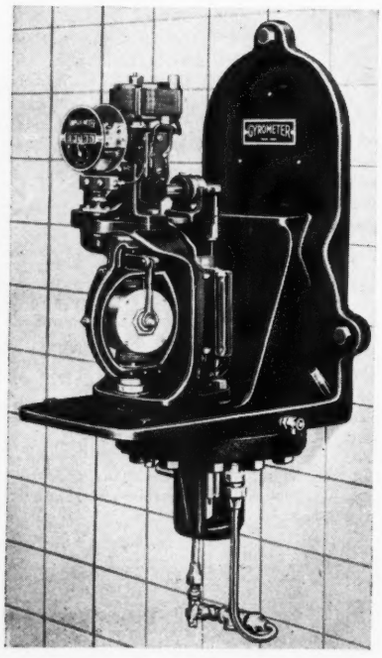


2

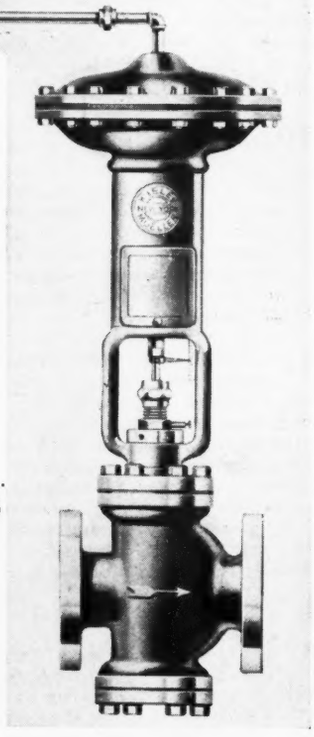


3





4



5

held in stainless-steel cover plate, and gaskets permit moderate flow pressures to be maintained through chamber without leakage. *National Technical Laboratories, Pasadena, Calif.*

1 AIR METERS, DRAFT GAGES—Line of air meters, draft gages and air-filter gages made of clear Lucite and models are available covering velocities as low as 400 fpm and as high as 8000 fpm. Chromium-plated graduated scale reflects image of liquid-column miniscus, erasing errors from parallax. Pitot static head, for portable models, measures 5/16 in. OD throughout with no projections, and may be held as much as 12 deg out of line to true direction of air flow without introducing errors. *Julien P Friez & Sons, Baltimore, Md.*

2 RECORDING THERMOMETER—Line of recording and indicating thermometers constructed for temperatures from —40 to 1200 F. Flat, spiral-actuating elements have sufficient pen torque without sacrificing speed of response. Special safety link between actuating element and pen provides overload safeguard. Chart is firmly secured to driving mechanism by tapered stud, and tapered chart-positioning stud, eliminating chart knob and chain. *Brown Instrument Co, Philadelphia, Pa.*

3 RING-BALANCE METER BODY—Unit constructed to give full scale readings on differentials as low as 2 in. of water at static pressures up to 20 lb psi. Gas is confined to ring-balance and does not come in contact with measuring elements. Changeable calibrating device provided to change scale ranges. Differential pressure from primary element in gas line is impressed on a 22½-in. OD welded-steel tilting ring, causing it to move a standard resistance scale in mercury well. This scale movement produces electrical resistance changes proportional to gas flow which actuate standard instruments, indicator, recorder, and integrator, at a remote point. *Republic Flow Meters Co, 2222 Diversey Parkway, Chicago, Ill.*

4 GYROSCOPIC METER—"Gyrometer" utilizes force developed from a gyroscopic couple and is available as a device for integrating flow of any fluid, whether liquid or gaseous, in any size pipe or main containing either venturi tube, nozzle, orifice or pitot tube. Unit is arranged for wall or bracket mounting. *Simplex Valve & Meter Co, 68th & Upland Sts, Philadelphia, Pa.*

5 LIQUID-LEVEL CONTROLLER—Control apparatus has floats from 6 to 12 in., of cast-steel, semi-steel, alloy steel, or other special materials, including lead lining for acid services. Ball-bearing stuffing box has stainless-steel 1-piece shaft. Packing in stuffing box completely removable from chamber without breaking connection of box in float chamber. Controllers available in direct-connected, pilot-operated, or in conjunction with air-operated instruments. *Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.*

6 POSITIVE-DISPLACEMENT FLOWMETER—Fuel-oil meter for small- and medium-size oil burners and diesels, uses float for measuring in chamber of 0.1-gal. capacity. Oil enters meter at *E*, flows through strainer and valve *V* into measuring chamber. When oil lifts float to predetermined height, it operates toggle mechanism to close inlet valve *V* and open outlet valve V_1 to let oil run into sump in bottom of meter. When 0.1 gal. runs into sump, float closes valve V_1 and opens valve *V* for another charge of oil. Accuracy guaranteed to be within 3 cu. in. in 5 gal. Can be used for measuring any liquid of fairly low viscosity. *Fluid Meters Inc, 44 Wall St, New York, N. Y.*

7 HYDRAULIC AND PNEUMATIC REGULATORS—Incorporate several new features, such as measuring elements equipped with adjustable weighbeams, provision for remote hand control, and standardized designs of supporting stands. Adjustable weighbeam facilitates adjustment of ratios between any two controlled quantities, all adjustments being made while regulator is in operation. Remote hand control allows individual regulator, power piston and controlled device to be positioned manually from remote point. *Republic Flow Meters Co, 2222 Diversey Parkway, Chicago, Ill.*

8 POINTER-STOP AMMETER—Type AP-9 equipped with adjustable stop, micrometer-screw-actuated, arranged to push pointer up scale. For measuring voltage dip on voltmeters, stop pushes pointer down scale. Measurements are made by successfully setting adjustable stop until position is reached where pointer barely moves in response to current or voltage impulse. Instrument then indicates rms current or voltage. *General Electric Co, Schenectady, N. Y.*

9 TEMPERATURE REGULATOR—Type SE, for any temperature between —40 and 650 F, is operated by single-phase ac current. Current consumption is less than 50 watts and no relays are required. Valve is throttling type and adjusts itself automatically to any position be-

tween wide open and closed. Sensitivity of regulator is adjustable in use, assuring balanced control without hunting. *Sarco Co Inc, 183 Madison Ave, New York, N. Y.*

10 GAGE COVER—Ashcroft non-breakable, transparent plastic case threads into gage glass. Has tensile strength of about 5000 lb psi, and compression strength of 15,000 lb psi. *Consolidated Ashcroft Hancock Div, Manning, Maxwell & Moore, Inc, Bridgeport, Conn.*

11 HAND TACHOMETER—Model S & S jewelled hand tachometer measures any speed from 25 to 30,000 rpm in three ranges. Operates on flyball-governor principle. Pointer turns twice around dial, with readings obtained from two sets of numerals, once for inside scale graduation, other for outside. *George Scherr Co, 128 Lafayette St, New York, N. Y.*

12 FLOW INDICATOR—MJL No. 98 rate-of-flow indicator is actuated by differential pressure produced by a primary device, such as orifice, venturi tube, or pitot tube, inserted in pileline. Differential pressure is balanced by calibrated bellows unit which moves in direct relation to pressure applied. Movement is transmitted to pointer and, since flow varies as square root of differential pressure, scale may be furnished to read directly in any units of flow desired, simply by using square-root scale of suitable range. *Morey & Jones, Ltd, 922 S Hemlock St, Los Angeles, Calif.*

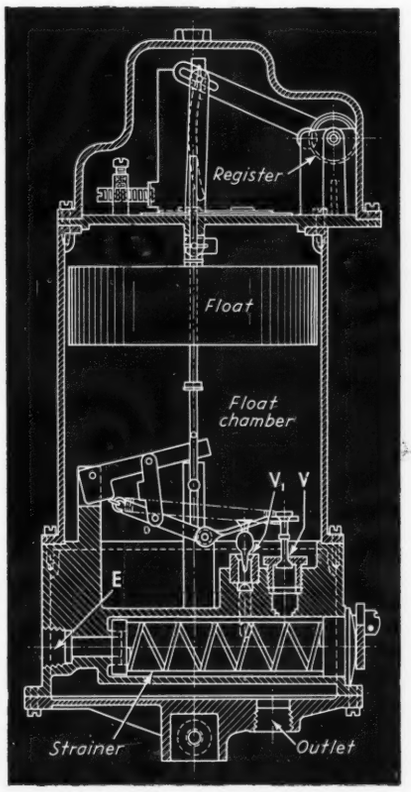
13 HIGH-PRESSURE GOVERNOR—Type 516 is for high-discharge pressures on oil or other liquids, and installation on piston-actuated governors, where discharge pressure is too high for standard diaphragm assemblies. Sizes range from 1- to 3-in. with screwed ends, and from 1- to 4-in. with standard flanged ends. Valve-body working pressures range from 125 lb at 450 F to 100 lb at 100 F. *Fisher Governor Co, Marshalltown, Iowa.*

14 AIR-FLOW METER—Diaphragm-operated air-flow mechanism, is for use with standard Bailey steam-flow, air-flow boiler meter. Flow connections can be made in economizers, air heaters or boilers, where high static draft precludes use of usual oil-sealed mechanism. Coated-silk diaphragm is clamped between flanges of metal housing. Air-flow connections made to housing on each side of diaphragm so that changes in differential pressures are measured and recorded in terms of air flow. *Bailey Meter Co, 1050 Ivanhoe Rd, Cleveland, Ohio.*

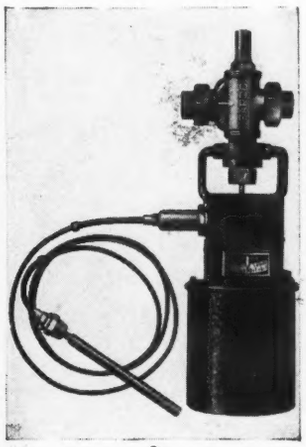
15 TEMPERATURE-PRESSURE RECORDER—Improvements of temperature and pressure recorder with 9-in. chart are: interchangeable tube system that can be replaced easily; pen-arm bracket supported by bearings at both ends; positive micrometer pen adjustment; convenient chart holders—turn of knurled knob releases gripping fingers and chart slips over. *C J Tagliabue Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.*

16 RECORDING DEMAND METER—Type BR-1, contact-operated, strip-chart recording demand meter combines 2-circuit totalizing relay and recording demand meter. May be used for single-circuit demand metering or for totalizing demands of two circuits. In combination with totalizers or totalizing relays, may also be used to record totalized demand of any number of circuits. Instead of conventional plunger, coil and ratchet arrangement, meter is actuated by Telechron motors controlled by 3-wire contacts. Suitable for wide range of load demands and provides continuous record of at least one month's operation on 6-in. chart. *General Electric Co, River Road, Schenectady, N. Y.*

FLOW-RATIO CONTROL—Unit controls automatically rate of flow of one fluid in definite ratio to flow of second fluid. Consists of two instruments, standard flow recorder, and standard flow-recorder controller. Rate of flow measured and recorded by one instrument, which sets control point on second. Latter then records and controls flow according to ratio selected. *Bristol Co, Waterbury, Conn.*



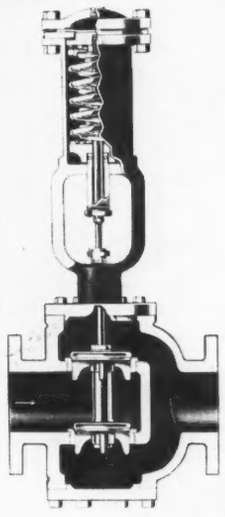
6

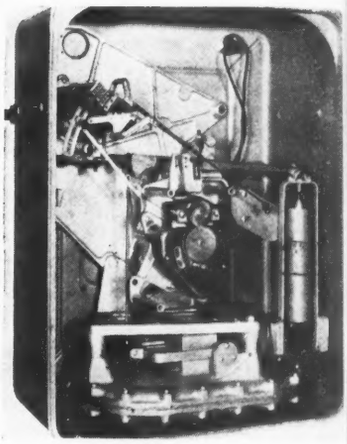

9

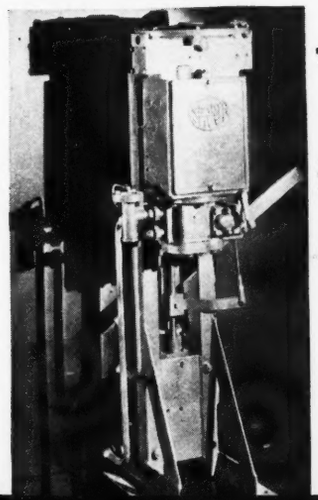
11

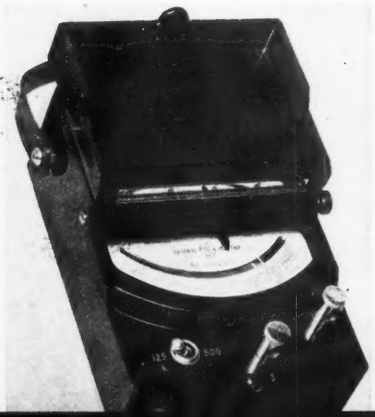
12

10

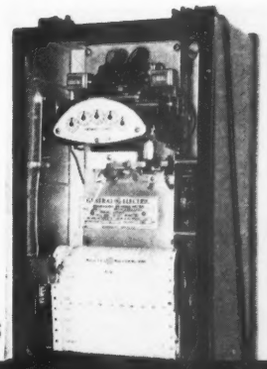

13


14


7


8

15


16

1 PRESSURE GAGE—Power gage for reading high pressures is accurate to 0.1% of reading. Provides accurate pressure readings on an indicating scale and can also transmit these readings to indicators and recorders and distant points. One of these gages is designed for maximum range of 10,000 to 12,000 lb psi. *Bailey Meter Co, Cleveland, Ohio.*

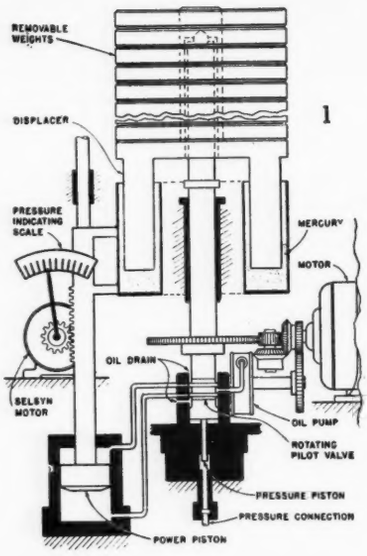
2 INDUSTRIAL STETHOSCOPE—Recording frequency analyzer discloses "sound" condition of motors and records results automatically on a graph. Equipment employs frequency analysis by "sweep" method, using small drive motor to actuate frequency dial which sweeps whole range of frequencies from 30 to 10,000 cycles per second. With this motor is synchronized another motor driving band of graph paper on which a stylus traces sound level at each frequency passed. Sharpness of frequency selection from great variety of sound that microphone picks up from a whirring machine is assured by finest available crystal filters. *Electrical Research Products Inc, 195 Broadway, New York, N. Y.*

3 HUMIDITY-TEMPERATURE RECORDERS—Round-chart recorders for relative humidity and temperature, are available for either daily or weekly operation. All recorders will handle complete relative-humidity range from 0 to 100%. Standard temperature range is from 0 to 100 F. One model of this instrument said to be first that transmits relative humidity direct from remote distances. *Julien P Friez & Sons Inc, Baltimore, Md.*

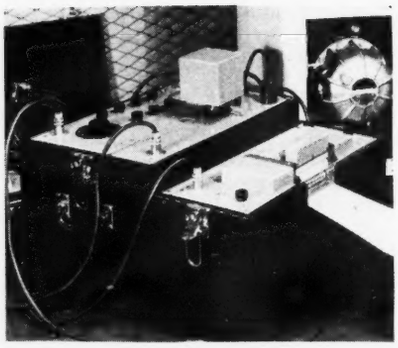
4 WARNING SIGNAL—"Filter Watchman" flashes light when excess dust load builds static pressure beyond danger point on air-conditioning filters or equipment. Accessory consists of dual metal disk, 12 in. in diameter, upon which is mounted housing containing contact device which flashes lamp. It is attached by threaded nipple and locking nut at conditioner unit, and can be set for any predetermined pressure. *Simplex Controls, St Louis, Mo.*

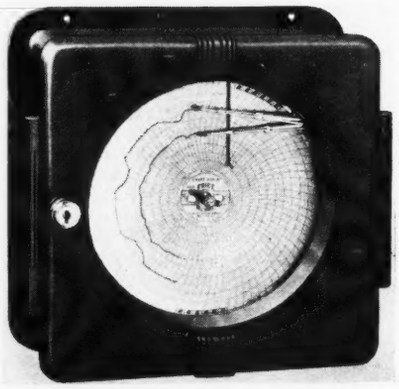
5 FLUE-GAS FILTERING SYSTEM FOR INDICATORS AND RECORDERS—Flue-gas filter, for use with Ranarex CO_2 indicators and recorders, takes place of former molded-refractory porous filter. New unit, of high-strength, permits blowing out filter with high-pressure air or steam. Another feature is large capacity, to provide longer operation with less attention. Unit has low draft loss to insure free gas flow even after filter capacity is partially exhausted. *Permutit Co, 330 W 42nd St, New York, N. Y.*

6 CO_2 INDICATOR—"Fyrite" pocket-size indicator has no valves, clamps or leveling bottle. In operation, gas chamber is filled with flue gas to be analyzed. Sampling hose is then detached, sealing instrument. To mix gas with absorption fluid, unit is turned upside down, then back to normal. Suction created due to complete absorption of CO_2 pulls absorbing

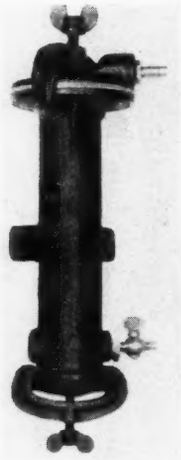


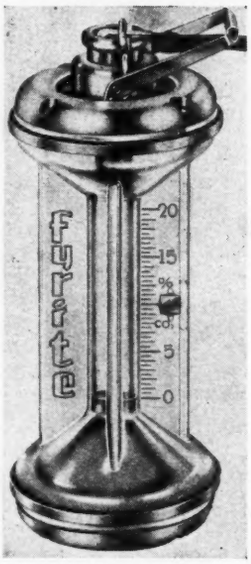
1


2

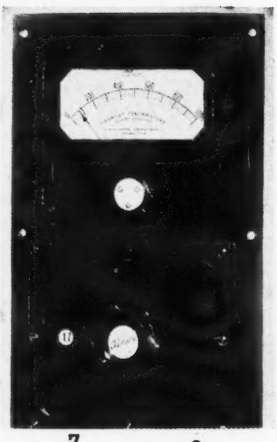

3

4


5



6


7 8

9

10

11

12

fluid in graduated tube an amount equal to CO_2 absorbed. Entire operation takes 1 minute. *Bacharach Industrial Instrument Co, 7000 Bennett St, Pittsburgh, Pa.*

7 MULTI-POINT PYROMETER—"Alnor" rectangular pyrometer for checking exhaust temperatures of diesels was designed to provide a moderately priced instrument with multi-point switch, arranged for either back or bottom conduit connection and which would be fully waterproof, fume-proof and dust-tight. Scale is 5 in. long and selector switch is set for 8, 17, 25 or 28 points. Every pyrometer installation requires one thermocouple for each zone of which a temperature reading is desired. *Illinois Testing Laboratories Inc, 420 N LaSalle St, Chicago, Ill.*

8 SPACE THERMOSTAT—Line of self-contained space thermostats provides heavy-load-carrying capacity without need for relays (25 amp at 120 volts, 15 amp at 240 volts). Exposure of coiled element on top of case assures great sensitivity. *Julien P Friez & Sons, Baltimore, Md.*

9 RECORDING THERMOMETER—"Serviceman" recorder has 1-day clock said to be extremely accurate and adjustable. Pen and arm built to swing free of dial when changing charts. Charts available for all temperatures from —20 to 110 F, in 45- and 90-deg ranges. Standard outfit comes with bottle of recorder ink and 50 extra charts. *Jas P Marsh Corp, 2073 Southport Ave, Chicago, Ill.*

10 CLAMP AMMETER—Model 633 Bakelite-encased ac clamp ammeter combines 6 ranges in one instrument, and will measure current flow through conductors (insulated or non-insulated) up to 2¼-in. in diameter. Instrument is equipped to measure low as well as high values. Actual full-scale ranges are 10/, 25/, 50/, 100/, 250/ and 500/ amp. Any one of these six ranges can be selected by turning easily operated range changer at thumb position. *Weston Electrical Inment Co, Newark, N. J.*

11 PNEUMATIC RELAYS—Complete line of pneumatic relays for temperature-control systems systems are applicable to control-fan and similar systems, unit ventilators, etc. Diverting relay is air-operated and can be used to divert source of air into either of two outlets, or can be used to feed air to branch line in one position, and stop main line and bleed branch line in other position. Graduate type transmits control pressure in air line leading from thermostat or other controlling device, to greater number of control motors or valves that controlling device, by itself would be unable to operate. *Minneapolis-Honeywell Regulator Co, 2950 Fourth Ave South, Minneapolis, Minn.*

12 ILLUMINATED DIALS—Dials illuminated by circular neon-type tube attached to ring which diffuses light over entire dial, thereby eliminating shadows and glare. Can be furnished on any standard Crosby gage in 10- and 12-in. sizes. Operating parts, including transformer and illuminating tube, are contained within case. Tube is mounted in front of dial and is attached to reflector ring by spring clips, both removable for inspection. Tube terminals make contact in plug-type base, eliminating wire connections. *Crosby Steam Gage & Valve Co, Boston, Mass.*

MISCELLANEOUS

1 STORAGE BIN — "Spin-A-Bin" provides compact storage space, consisting of bins attached to revolving assembly. Bins are spot-welded, 26-gage steel. Unit contains 24 bins, either 3x3x2½ in. or 4x4x3 in., in which bolts, washers, screws, etc, can be stored. Description of contents may be written on front of each compartment. *Noggle Products Co, Ann Arbor, Mich.*

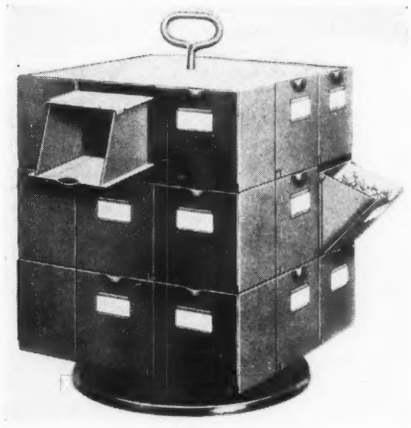
2 PORTABLE BLOWER—"Cadillac" all-purpose, 2-speed blower can also be used as suction cleaner or sprayer. Capacity of 176.5 cfm on high speed, 125 cfm on low. Sand-cast aluminum housing; single-cast aluminum fan, statically and dynamically balanced; 3-cord Underwriters' approved, heavy-duty cable for positive grounding; universal ac-dc motor; sealed ball bearing. *Clements Mfg Co, Chicago, Ill.*

3 BLUE-PRINTING MACHINE — Model 22 uses patented actinic arc lamp and switch arrangement which permits lamps to be operated at any of three speeds. Washer made up of 3 horizontal water tanks, where paper floats while being washed. Aluminum drums used to dry paper evenly, and hypo and potash applications changed by lever. *C F Pease Co, Chicago, Ill.*

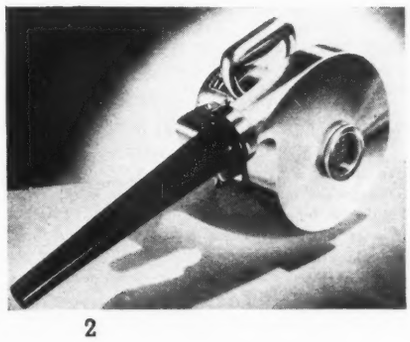
DRAFTING CLOTH — "Pencil-Tex" pencil drafting cloth is claimed to produce sharp, uniform, ink-dense line with hard pencils. This line intensification, together with a glass-like transparency, permit reproduction of a blueprint with the sharp contrast of prints made from ink tracings. *Frederick Post Co, P O Box 803, Chicago, Ill.*

TELEPHONE SYSTEM—11-A magnetic telephone gets its power solely from speaker's voice and enables user to call any of five other stations. As many as six instruments can be connected to form a network on which calls may be made between any two or conferences held over entire system. Additional stations can be combined in one system, but selective signaling is limited to six positions. Instrument is intended for communication at close range only, but suitable transmission was obtained over an artificial line of No. 9 copper wire 200 miles long. *Western Electric Co, 195 Broadway, New York, N. Y.*

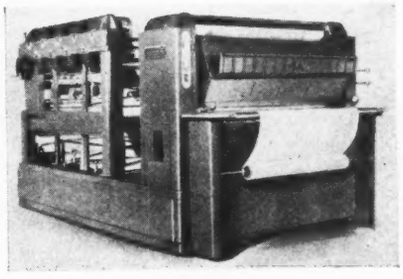
BLUEPRINT REPRODUCER—"Elpro" printer makes positive prints from tracings, drawings, plans, specifications, etc, in from 1 to 5 minutes in sizes up to 12x18 in. Consists of a case in which Ozalid dry-process paper is inserted, together with drawing or tracing to be reproduced. Case is closed for specified time, then exposed print is rolled and put into ammonia developer case. Operates on 110 ac current and can be supplied for 110 dc. *Electronic Products Mfg Corp, 208 W Washington St, Ann Arbor, Mich.*



1



2



3

HYDRAULIC ELEVATOR—"Oildraulic" elevator uses oil instead of water for motive power. Corrosive action of water eliminated; oil can be used over again. Uses 7-cylinder radial pump to force oil back into system. When in lowered position, elevators form part of floor or loading platform. *Rotary Lift Co, Memphis, Tenn.*

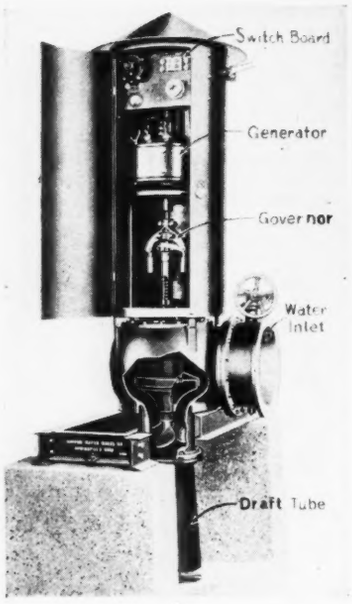
PERFORATE RUBBER—"Multipore" consists of latex rubber with from 1100 to 6400 holes per sq in. formed by expansion of air through film of liquid rubber latex. Available in two types: "plain", vulcanized immediately after holes are formed; and "expanded", which is stretched or expanded before vulcanization. *U. S. Rubber Co, Mechanical Div, 1790 Broadway, New York, N. Y.*

VOICE-POWERED TELEPHONE—Model T "Telfone" is equipped with special transmitter and receiver sealed into handle. Attached to handle is 40-in. wire finished at its end and equipped with spade tips and stay hook. Two instruments, connected together by 2-conductor wire, and used in conjunction with signalling system, make complete communicating system with transmission and reception good for 200 to 300 ft. *Telfair Telfone Corp, West Orange, N. J.*

CLEANSING COMPOUND — "Annite" red-label detergent is low-titre vegetable compound made in powder form, and contains no caustic, lye, acid, abrasive, animal fats, or inert filler. Said not to have any injurious effect on personnel using it, and claimed to be non-inflammable. *Quigley Co Inc, 56 W 45th St, New York, N. Y.*

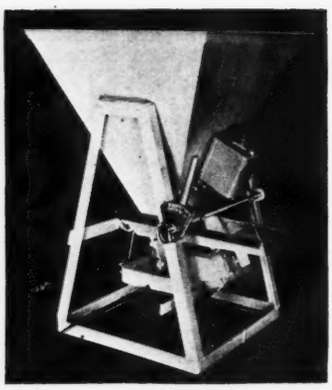
ALLOY STEEL—"Croloy 7" is alloy steel for high-temperature service in tubular form, and contains chromium, carbon, molybdenum, and silicon. Data on high-temperature strength, short-time high-temperature properties, and other characteristics, under observation. *Babcock & Wilcox Tube Co, Beaver Falls, Pa.*

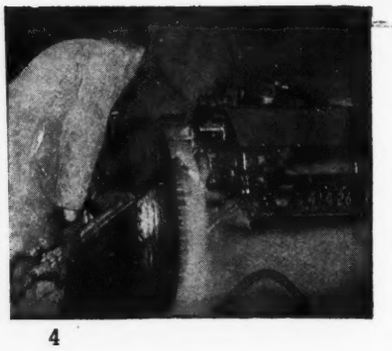
DRAFTING MACHINE—Model 77 drafting machine has arm completely enclosing bands and working parts, to minimize accumulation of

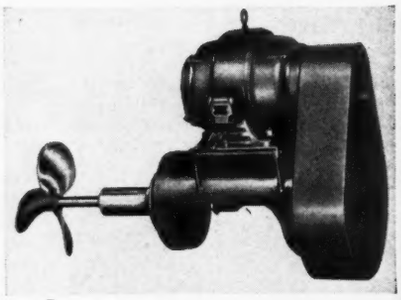


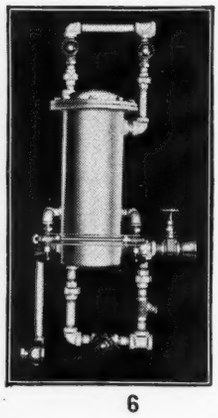
1

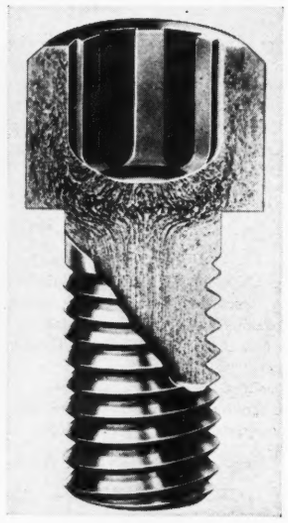
2

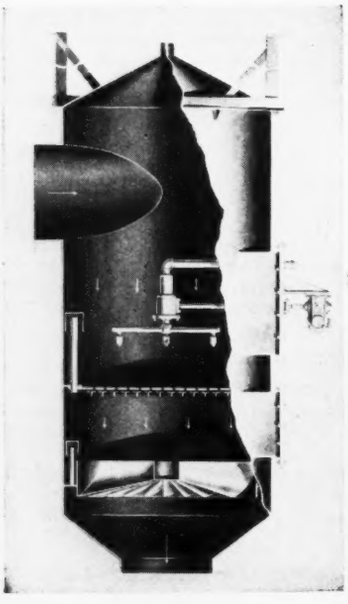

3


4


5


6


7


8

9

10

dirt between band and wheels. Additional improvement in form of full-vision protractor, located entirely above arm, gives unrestricted vision and greater operating convenience. Secondary 360-deg protractor movement permits setting of protractor at any angle on drawing. *Universal Drafting Machine Co, Cleveland, Ohio.*

1 HYDROELECTRIC UNIT—"Hoppes" unit designed to provide power from small water flow. Switchboard, generator and governor are inclosed in a circular casing above the water wheel as protection from weather. Vertical design permits placing electrical equipment above flood water. Unit mounted on I-beam foundation for easy installation. Unit started and stopped by worm-gear-operated butterfly valve at water-wheel intake. Speed regulated by governor on turbine shaft. Units built in 0.5- to 10-kw capacity for 8- to 30-ft heads. *James Leffel & Co, Springfield, Ohio.*

2 SCREW THREAD SYSTEM — "Aero-Thread" screw thread system uses spirally wound insert or bushing of precision-formed, high-tensile bronze spring wire. This insert fits into a tapped hole by screwing threads and design of insert is such that when it is screwed into place, it becomes part of tapped hole. Can also be removed and replaced if necessary. *Air Associates Inc, Roosevelt Field, Long Island, N. Y.*

3 DRY FEEDER—Model FM-0-10 feeder is designed as piece of laboratory equipment and is used for feeding extremely fine materials or chemical reagents. Rate of flow of material regulated by amplitudes of trough's electromagnet vibrator, which is controlled by rheostat. Hopper is kept free by small electro-magnet vibrator attached to one side, preventing arching over and clogging of material. *Syntron Co, 492 Lexington Ave, Homer City, Pa.*

4 STEAM GUN—Oakite steam gun, for removing heavy accumulations of dirt, grease, etc, from industrial machinery and equipment, automatically lifts cleaning solution from floor level to a height of over 10 ft without aid of pumps, injectors, gravity feed or other auxiliary apparatus. All that is needed to operate this gun is steam and solution hoses, steam supply, and an open-top drum or other solution container. *Oakite Products Inc, 22 Thames St, New York, N. Y.*

5 SIDE-ENTERING MIXER — "Lightnin" mixer has motor mounted on steel platform actuated by riser bolt, allowing for maximum adjustment for belt tension or bearing replacement. Has cartridge-type rear bearing, belt-guard and frame on V-belt model. *Mixing Equipment Co, Inc, Rochester, N. Y.*

6 RUST PREVENTATIVE—"Mogul Pressure Jet" system claimed to prevent rust, corrosion and congestion in steam mains, both high- and low-pressure, for heating and process. A specially developed product vaporizes and atomizes when introduced into steam main by equipment shown in illustration. Equipment consists of housing containing copper coil, valves through which rust preventative is introduced, gage to show amount held in housing, and necessary connection for steam inlet, steam outlet and trap return. *North American Fibre Products Co, 1612 Keith Bldg, Cleveland, Ohio.*

7 CAP SCREW—"Bristo" cap screw has patented head which provides socket with splines. Manufacturer claims turning force of screw increased by addition of these splines. Illustration shows fibrous grain structure of cap screw, said to assure turning force in direction of rotation without tendency to split. *Bristol Co, Waterbury, Conn.*

8 GAS SCRUBBER—In this triple-action scrubber, gas enters near scrubber base and is relieved of coarse particles by cyclonic action. Gas passes upward through zone of water or scrubbing liquid, supplied by slowly rotating sprays. Dust particles mingle with water droplets at this stage. Mixture of gas, dust and droplets is shot through perforated plate at square impingement baffles, constantly wet, arranged so that stream coming through strikes a baffle at maximum velocity. Dust particles and water droplets merge with water surrounding baffle, dust particles being permanently captured in scrubbing liquid. Gas or air, freed from impurities, is deflected around baffles and continues upward toward outlet of shell, eliminator vanes entrapping any droplets car-

ried upward in gas stream. *Peabody Engineering Corp, 580 5th Ave, New York, N. Y.*

9 PORTABLE FIRE EXTINGUISHER — "Kidde-Lux" portable 2-lb CO_2 fire extinguisher features pistol-grip handle and trigger control valve. Discharge horn is self-locking in any one position according to direction of fire. Can be operated with one hand with finger-tip control, said to make for easy and efficient discharge of CO_2 onto fire. *Walter Kidde & Co, 140 Cedar St, New York, N. Y.*

10 FLOOR RESURFACER—"Montmorillonite," new concrete repair material, which is mixed with rugged-wear resurfacer, is said to increase coverage capacity per lb. Is composed of manganese, silica, alumina, and iron, and mixes easily with cement, sand and stone. Can be applied in much the same manner as cement. *Flexrock Co, 23rd & Manning Sts, Philadelphia.*

HARD RUBBER FILTER—Microporous hard rubber, used as filter diaphragm, contains continuous network of microscopic pores. Tear-resistance adequate and bursting strength said to withstand ordinary conditions of service. For filtration work under pressure, material is made up reinforced with woven asbestos or stainless steel, providing greater tear resistance and bursting strength without reducing permeability. *U. S. Rubber Co, Mechanical Div, 1790 Broadway, New York, N. Y.*

INSULATION—"Rockwool Blanket" manufactured by felting large flat sheets of B-H high-temperature-resisting insulating wool between various styles of metal fabric. Standard sizes are 8 to 16 sq ft, making it possible to insulate large areas easily. Blanket is flexible, and according to manufacturer will not break in handling. —*Baldwin-Hill Co, 575 Klagg Ave, Trenton, N. J.*

PROPORTIONING SYSTEM—"Xacto" system is designed to compound, blend or mix oils, gasoline and other liquids. Mixes from 2 to 5 or more liquids, and parts of system can be discontinued when not in use. Consists of necessary Xacto meters, proportioning mechanisms, control valves, automatic shut-off valve, discharge header piping, and mixer. *S F Bowser & Co Inc, Fort Wayne, Ind.*

SEWAGE EJECTOR—"Package" pneumatic ejector, formerly built separately, now furnished with controls and compressor mounted on top of ejector receiver. No moving parts in ejector receiver, no stuffing-boxes, and no floats, bells or air-storage tanks. Stationary electrode control provided, and piping and wiring connections between compressor, ejector, motor and controls made at factory. *Yeomans Bros Co, Chicago.*

WIRE-ROPE CLAMP—Inner surface that grips rope is double-spiral splined to fit each strand and wire of rope, thus making secure grip on each section of each wire and strand. Gripping halves of clamp are held tightly to rope by taper threaded nuts. Made of high-tensile steel and maker claims it will outpull any wire rope made. *National Production Co, 4561–4603 St. Jean Ave, Detroit, Mich.*

DRAWING INSTRUMENTS—Keuffel & Esser drawing instruments now being made in this country, under trade name of "Minusa." Instruments have slender rounded-taper construction. Special hard-rolled nickel-silver stock said to give unusual rigidity to compass, dividers and springbows. *Keuffel & Esser Co, Adams and 3rd Sts, Hoboken, N. J.*

MOTOR RAM—"Motoram" produces straight-line power stroke in two directions, operated by electrical motor and equipped with self-contained electrical and mechanical limit switches to stop shaft movement at any predetermined point of travel in either direction. Movable thrust shaft has minimum travel of ½ in. and maximum of 72 in. Movement can be automatically stopped or reversed to a precision of 0.005 in. of travel. Applications include remote operation of variable-speed transmission, hopper dump gates, etc. *Electromarine Corp, Westport, Conn.*

MOTORS, SWITCHES AND OTHER ELECTRICAL EQUIPMENT

1 CIRCUIT BREAKER—Type ET uses standard 600-amp frame size and incorporates 20,000-amp interrupting capacity. Trip units are interchangeable, also calibrated and contained in case sealed to prevent tampering. Instantaneous trip features are calibrated at 6 to 8 times ratings of circuit breaker. Handles are dark red Bakelite to distinguish from standard 600-amp-frame circuit breaker. *ITE Circuit Breaker Co, Philadelphia, Pa.*

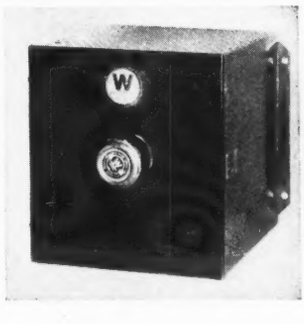
2 HEAVY-DUTY FIELD RHEOSTATS — Type JM mill-type consists of a faceplate with contact arm and tube resistors assembled as unit in frame. Faceplate provides 60-point speed control. Vitreous-enamel-protected "Ribflex" and "Vitrohm" resistor tubes are assembled in frame of insulated tie rods attached to faceplace. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

3 SPEED INDICATOR — Electric remote speed indicator for U.S. "Varidrive" motor, consists of meter as indicator mounted in box with pushbutton for controlling electric pilot that changes speed. Indicator calibrated in divisions from 1 to 10, but scale may be calibrated to suit purchaser. Remote indicator station may be replaced by single push-button-station or automatic-control equipment. *U. S. Electrical Motors, Inc, Los Angeles, Calif.*

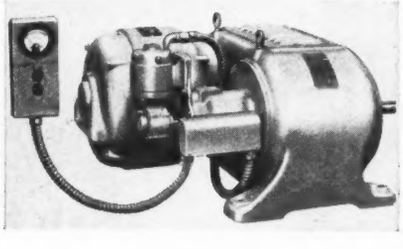
4 PACKAGED AC GENERATING UNIT—Requires only 3 wires from generator to switch and 3 wires to load. When unit is in parallel with another unit, it is made self synchronizing by automatic synchronizer, which operates within generator speed zone of 97 to 103% synchronous speed. As soon as incoming generator reaches proper speed, generator switch closes automatically first time generator voltage comes into phase with bus voltage. Design provides compact, small-capacity unit. *Electrical Machinery Mfg Co, Minneapolis.*

5 SAFETY MOTOR SHUTOFF—"Planatorque" motor drive provides protection for agitators, mixers, conveyors, etc, which become jammed or overloaded. When speed ex-

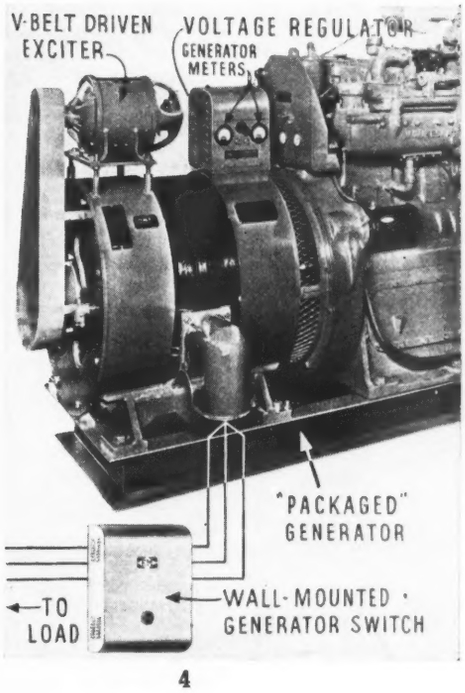
1



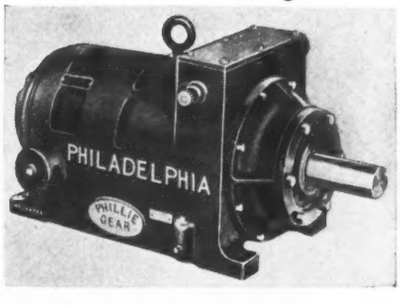
2



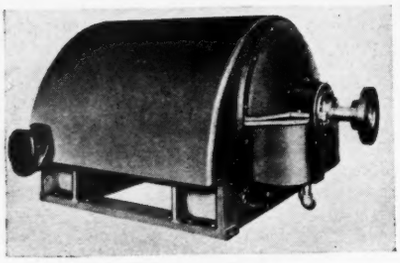
3



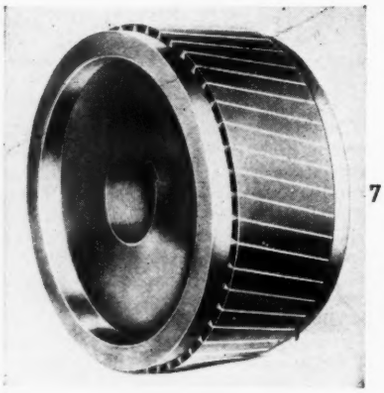
4



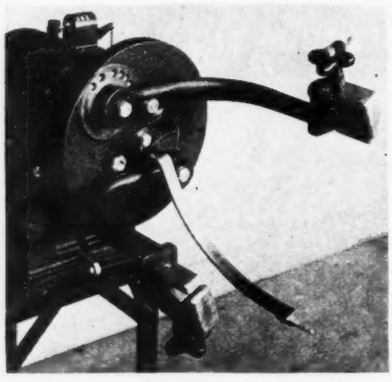
5



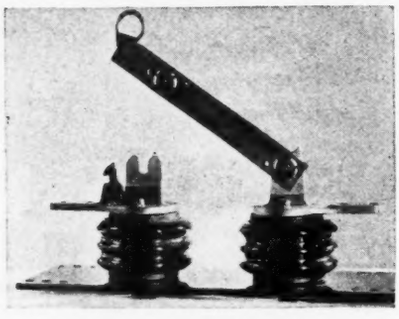
6



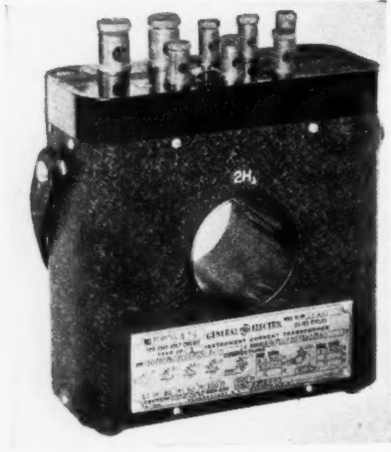
7



8



9

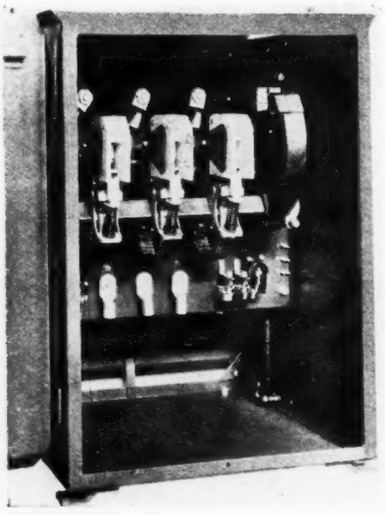


10

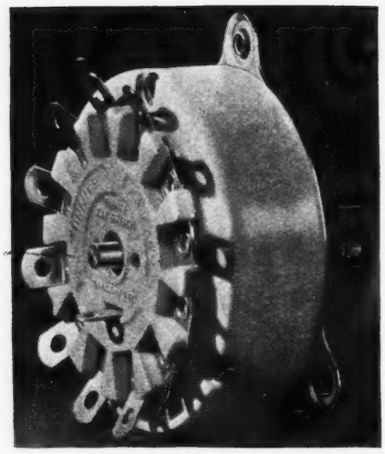
11

12

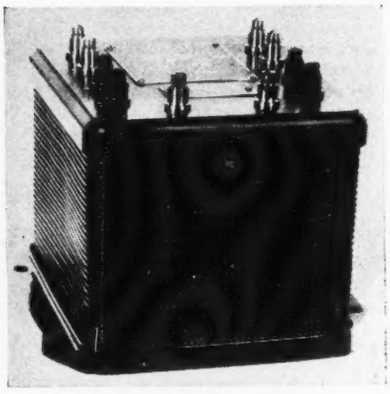
13



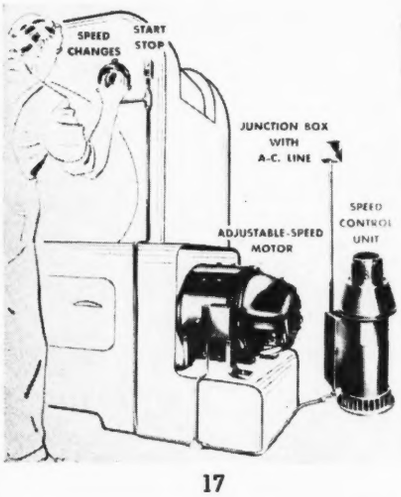
14



15



16



17

18

ceeds certain limit, compressed torque spring turns off power switch. Unit is ready for restarting as soon as overload is removed. Units furnished for vertical or horizontal drives, for all horsepowers and ratios, and for clockwise or counter-clockwise rotation. *Philadelphia Gear Works, Philadelphia, Pa.*

6 INDUCTION MOTORS—Heavy-duty, 600-—3000-hp motors feature quieter operation with minimum windage noise, and radio-frequency tested insulation. Bearings are combination oil-ring and forced lubrication. Motors may be started at full or reduced voltage and deliver normal starting torque with normal starting current. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

7 COPPER ROTOR — "Copperspun" rotor pure copper. Rotor bars and end ring formed by pouring molten copper into mold that holds punched laminations, stacked and held under pressure. Copper is poured into one end as entire mold is spun at high speed. Opposite end ring formed by material which has passed through rotor slots during casting process. After casting, rotor is machine-finished over all surfaces. *Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.*

8 ARMATURE-WINDING YOKE — "Ideal" yoke will hold any armature with shaft from 9 to 19 in. long. Wires guided into slot by hand, enabling operator to wind armatures in lathe or special coil-winding machine. Has two cast-iron arms fastened to round cast-iron mounting base which can be adjusted to increase or decrease amount of yoke span by swinging them toward or away from center of disks. *Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.*

9 INDOOR DISCONNECTING SWITCH—Designed for hookstick or group operation, line of switches available in sizes from 400 to 6000 amp for 7500- to 34,000-volt service. To increase ease of operation, operating eye and blade latch have been designed to produce cam or pryout action, which disengages blades from tongue member. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

10 FIELD-TESTING CURRENT TRANSFORMER — JP-1 portable current transformer has combination of wound-primary and through-primary construction, with tap in secondary, used to secure more ratios. Core window is 2¾-in. diameter. Primary ratings of 10, 20, 50 and 100 amp obtained from wound primary with terminals in top of case. Passing primary cable through core window once obtains ratings of 600-800 amp; passing it through two or more times obtains ratings of 150, 200, 300, 400 amp. Transformer's secondary rating is 5 amp. *General Electric Co, Schenectady, N.Y.*

11 CABLE-FAULTS TESTER—Morse-Newhall test assembly, for locating high-resistance faults, is a modification of Murray loop circuit. Operating at very high voltages, it eliminates need for breaking down fault resistances. Also, is adapted for Wheatstone-bridge measurements and for approximations of resistances by voltmeter method. These auxiliary circuits make it possible to analyze faults on same instrument used to locate them. *Leeds & Northrup Co, 4901 Stenton Ave, Philadelphia, Pa.*

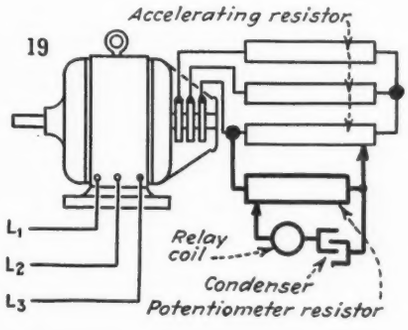
12 FIELD-FREQUENCY RELAY—In starting synchronous motor, there is a most favorable period for applying excitation current to field coils. Polarized field-frequency relay has been developed to close automatically field circuit at correct time. It is continuously conscious of alternating north and south polarity of induced current in motor-field winding during starting period. Therefore, relay always operates in half cycle of induced-field-current wave that is of correct polarity for applying field excitation. This insures that motor will develop maximum pull-in torque to bring its load into synchronization in minimum time and with least possible voltage disturbance resulting from current surges during starting. *Electric Machinery Mfg Co, Minneapolis, Minn.*

13 SMALL ELECTRIC PLANTS—Ac units rated at 450 watts, dc at 500 watts, first named providing 110-volt, 60-cycle current at 1800 rpm with reserve for temporary overloads. Electric push-button starter built in, with 6-volt starter battery which can be automatically charged. Ac types also available with remote-control stopping and starting stations. *Eicor Inc, 515 S Laflin St, Chicago, Ill.*

14 NON-REVERSING LINESTARTERS — Features include low-voltage protection or release through low-voltage relay, bimetal type of overload relay, hand or automatic reset, saturated current transformers, and magnetic blowouts. Saturated transformers said to insure adequate protection on slow-starting applications, and blowouts claimed to insure adequate arc-rupturing capacity. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

15 TAP SWITCH — Model 412, 40-amp, heavy-duty, rotary, multi-point selector tap switch is said to provide more practical answer to circuit-switching requirements for battery chargers, tapped transformers, arc welders, ventilating fans, and motor control. Model illustrated, rated for 240 volts ac non-inductive circuit is 4-in. diameter and has maximum of 12 contacts. *Ohmite Mfg Co, 4835 Fluournoy St, Chicago, Ill.*

16 THERMAL CONVERTER — "Thermoverter", when connected in ac metering circuit, performs conversion from ac watts to dc millivolts. Power load may be directly expressed by dc potential difference suited to transmission over considerable distance. Has no make-and-break contacts, field adjustments or moving parts. With either direct-deflecting millivoltmeter or potentiometer as measuring instrument thermoverter can measure ac power in one or a number of circuits and telemeter power or totalized load. *Bristol Co, Waterbury, Conn.*



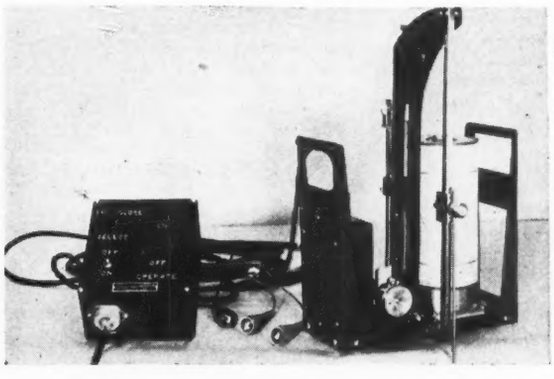
17 VARIABLE-VOLTAGE CONTROL—All-electric adjustable-speed drive in small ratings, employing variable-voltage control, comprises 3500-rpm squirrel-cage motor, dc generator and exciter mounted vertically with starting switch. Adjustable-speed dc motor for driving machine, speed-changing rheostat, and start-and-stop pushbuttons complete drive. Brushes on dc generator connect directly to those of dc motor. Exciter connects directly to dc-motor field coils and to dc-generator field coils with field rheostat in series. Turning field rheostat gives speed range of 12 to 1. *Reliance Electric & Engrg Co, 1057 Ivanhoe Rd, Cleveland, Ohio.*

18 CHARGE CONTROL UNIT — Model ES battery-charge control is designed for use with any of following charging systems: either bulb or dry-disk types of rectifiers, dc generators, or dc bus with charging resistors. Within cabinet, small self-starting synchronous-motor-driven interval-time switch, operating from 60-cycle ac supply, starts charge or increases it once every hour by resetting temperature-compensated relay, which, in turn, operates an auxiliary. As soon as battery voltage rises to relay-operating voltage, contacts of latter open, de-energizing auxiliary relay, which then opens its contacts to stop charge. *The Electric Storage Battery Co, Philadelphia, Pa.*

19 FREQUENCY-RELAY CONTROL—Uses simple resonant circuit comprising frequency-relay coil, condenser and potentiometer resistor. This circuit gets its voltage from ac wound-rotor-motor-rotor circuit (see diagram). Since rotor voltage and frequency vary with speed of motor, resonant circuit gives sharp current peak through relay coil at given peak, to close relay. This makes possible operation at any predetermined frequency. Sliding-bar contact on potentiometer resistor provides vernier adjustment to obtain exact operating results. Accuracy of control for wound-rotor motors permits matching motor-accelerating torque to load requirements. *Electric Controller & Mfg Co, Cleveland, Ohio.*

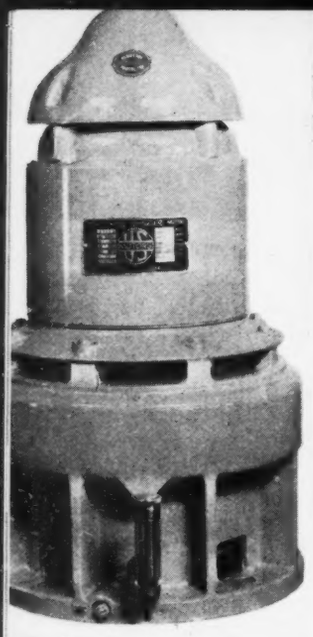
20 CIRCUIT-BREAKER ANALYZER — Designed for oil circuit breakers, device consists of two main elements: vertical drum carrying ruled chart, driven by a synchronous motor through gear reducers, and pencil slider operated through reducing mechanism by lift rod of oil breaker. Rotary motion of drum gives time in cycles as abcissa on chart, while ordinate represents travel of circuit-breaker contact mechanism. *Cincinnati Clock & Instrument Co, 1117 Harrison Ave, Cincinnati, Ohio.*

21 TRANSFORMER COOLING FAN—Portable cooling fan said to increase transformer capacity and life by removing heat film from plates through scrubbing action of air. Blades of cast-aluminum alloy are driven by watertight motor. Has 5000 cu ft capacity in free air, and 3000 with 1-in. static pressure. Fan and motor mounted on base, which can be adjusted to tilt from horizontal to vertical. *Diehl Mfg Co, Elizabethport, N.J.*

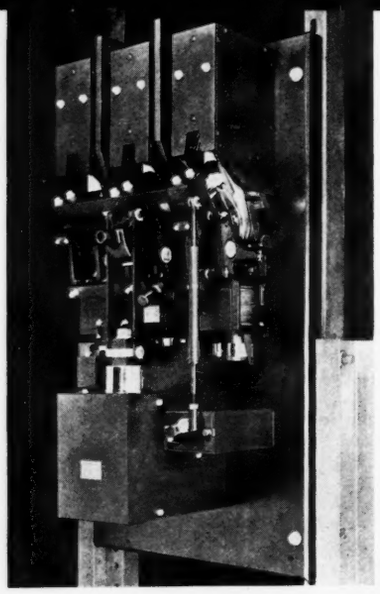


20

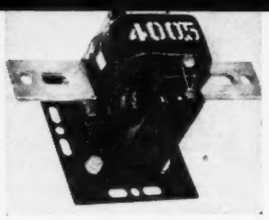
21



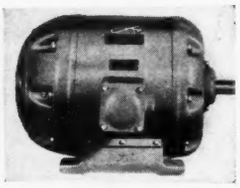
1



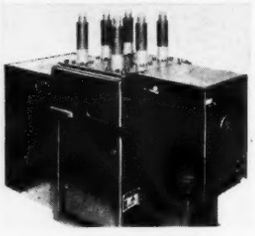
3



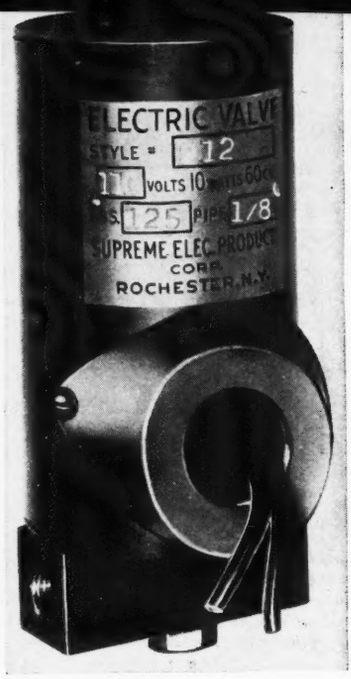
5



6

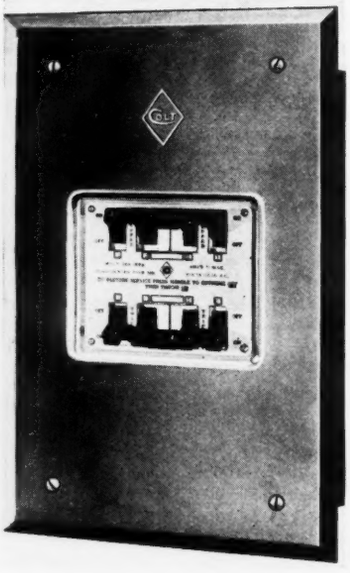


7

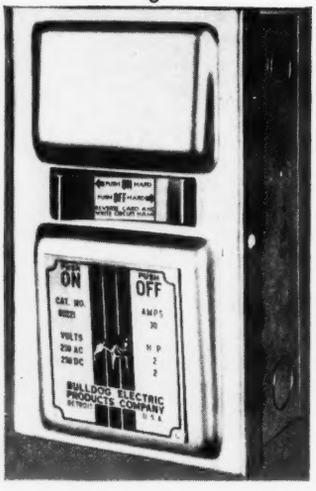


9

2



4



8

10

1 VERTICAL MOTOR—"Syncrogear" unit, type GDV, with flange base, was designed to meet conditions peculiar to vertical operation. Small geared oil pump supplies bearings, gears and pinions with sufficient continuous lubrication. *U. S. Electrical Motors, Inc, Los Angeles, Calif.*

2 RECTIFIER UNIT—Small-capacity, permanently evacuated rectifier unit consists of glass bulb, resiliently mounted, in a trunk-type framework located waist-high in upper part of cubicle chamber. Lower portion contains cooling fan. Made in sizes ranging from 50 kw at 250 volts to 300 kw at 600 volts, or higher, for conversion of dc to ac. *Allis-Chalmers Mfg Co, Milwaukee, Wis.*

3 AIR CIRCUIT BREAKER—Has De-ion arc chamber, device which operates on either ac or dc current within range of interrupting ratings. Arcing current is limited to ½ cycle, which minimizes noise. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

4 MULTI-BREAKER LOAD CENTER—Available in three types, for 1 to 16 circuits. Units operated without fuses, and are on-off toggle type. Constructed with breaker ratings from 15 to 50 amp, and can be supplied with raintight boxes. *Colt's Patent Fire Arms Mfg Co, Hartford, Conn.*

5 INDOOR CURRENT TRANSFORMER—Type JL-1 is rated 600 volts, made in three current ratings: 200-5, 400-5 and 600-5 amp. Primary windings are large enough to permit continuous operation at 150 per cent of rated primary current. *General Electric Co, Schenectady, N. Y.*

6 EXPLOSION-PROOF MOTORS—Line of fan-cooled, explosion-proof ac or dc motors is of solid-cast-iron construction, with reinforced end bells, extra large conduit box, cartridge-type bearings, easily removable fan guard, extra-heavy steel cover, and ribbed housing construction. For use in all Class 1, Group D explosive atmospheres. *Louis Allis Co, Milwaukee, Wis.*

7 AIR CIRCUIT BREAKER—"Magne-Blast" breaker, for 2300- to 5000-volt circuits, has interleaving chute formed by long, tapered fins alternating from either arc chute wall and extending from throat and arc runner to mouth of arc chute. Arc is cooled and extinguished on interleaving chute, adding resistance to circuit as arc is extinguished. *General Electric Co, Schenectady, N. Y.*

8 SAFETY SWITCH AND PANELBOARD—"Rocker" safety switch, 30-amp front-operated, has curved molded handle which is rocked by thumb action to On or Off position. Handle and switch mechanism are all one piece, operating on knife-edge bearings. Panelboards are porcelain for maximum dielectric strength and are said to be resistant to heat. *Bull Dog Electric Products Co, 7610 Jos Campau Ave, Detroit, Mich.*

9 SOLENOID VALVE—Type H has lower section of coil housing empty which provides terminal chamber into which wires are pushed after making electrical connections. Adaptor receives straight or angle BX connector or conduit lock-nut. For cord connections, porcelain bushing is inserted as adaptor. *Supreme Elect Products Corp, Rochester, N. Y.*

10 BATTERY CHARGER—"Phano-Charger" is automatic and self-regulating electronic rectifier, uses industrial-type metal Phanotron rectifier tubes, and is made in three sizes: 4.5- and 12.5-amp to operate from single-phase power supply, and 25-amp to operate from 3-phase ac supply. *General Electric Co, Schenectady, N. Y.*

11 HOOD-NUT CONNECTORS—For use with rubber- or compound-insulated cables at points where they are joined to other cables, switches, etc. Tapping is done from shroud or nut to rubber insulation of cable, preventing entrance of moisture between insulation and conductor. *Burndy Engineering Co, 459 E 133rd St, New York, N. Y.*

12 SYNCHRONOUS MOTORS—Line of ac fractional-hp motors are applicable where long-lived source of low-speed torque at constant speed is needed. Are essentially inductor alternators operated as motors with an Alnico permanent magnet field replacing usual dc-excited field. *General Electric Co, Schenectady, N. Y.*

13 INDOOR TRANSFORMERS — Dry-type units are rated 200 and 400 amp, 600 volts; and 600 amp, 600 volts. Will withstand 150 per cent normal current, and also have strength against instantaneous over-current. On 200- and 400-amp units, windings will stand 250 times normal current mechanically, and 80 times normal current for one second, thermally. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

14 OIL CIRCUIT BREAKER—Type KDZ-40 is equipped with "ruptors", special devices used to give efficient interruption of short circuits along with low arc energy, low pressure, and small oil deterioration. Furnished for 600 and 1200 amp at 15 kv, and 2000 amp at 7.5 kv. Interrupting capacity rating is 100,000 kva. *Allis-Chalmers Mfg Co, Milwaukee, Wis.*

15 MULTI-BREAKER—Type MO serves as service center or load center for lighting and can be supplied to control one or two circuits. Box can be furnished with grounded neutral, insulated neutral, or no neutral. Either surface or flush mounting; 15, 20 or 25 amp. *Colt's Patent Fire Arms Mfg Co, Hartford, Conn.*

16 AIR-COOLED TRANSFORMER—Streamlined models cover all standard voltage characteristics from ¾ to 10 kva. Manufacturer claims high full-load operating efficiency is maintained through following features: air-draft external ventilation, and wound hand-finished coils, with cores of low-loss steel. *Acme Electric & Mfg Co, Cleveland.*

17 AIR CIRCUIT BREAKER—Air-blast, oilless-type now made for 15,000-volt service with interrupting ratings of 500,000 to 1,500,000 kva. Air compressed at 150 lb. is used to operate breaker as well as interrupt circuit. High-pressure air stream removes arc products through special air-blast chamber and exhaust muffler. *General Electric Co, Schenectady, N. Y.*

18 BUS SUPPORT—Improved bus support includes following features: interlocking teeth on neck of device permit setting tubular bus at angle to steel structure. Fine adjustments obtained by slightly ovalized bolt holes in base. *Burndy Engrg Co, 459 E 133rd St, New York, N. Y.*

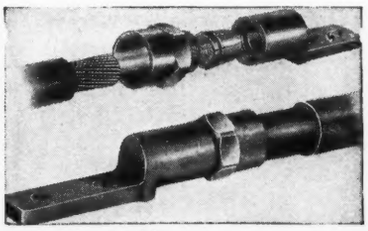
19 ELECTRIC TERMINAL—Terminal conector accomodates range of wire or cable sizes. Constructed in one piece, and has pressure strip to prevent clamping screw from damaging conductor. Comes in sizes for all conductors from No. 14 to 4-0, tinned to prevent corrosion and discoloration. *Burndy Engrg Co, 459 E 133rd St, New York, N. Y.*

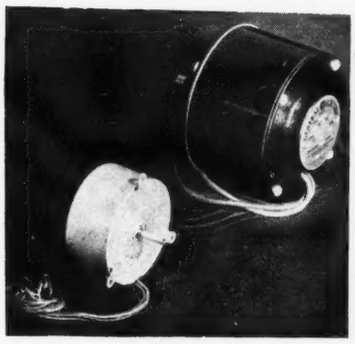
20 ARMATURE BALANCING WAYS—Compact unit for static balancing of motor armatures requires no leveling or setting-up time. No centers needed for balancing, as free-turning semi-steel disks mounted on precision ball bearings carry armature. *Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.*

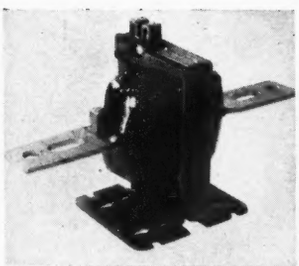
21 CIRCUIT BREAKER—Type MO available in 15-, 20- and 25-amp sizes for 115-230-volt, single- and 2-pole applications where type D fusible switches have been used. Will open circuit under same overload conditions every time, but will not open circuit during brief period of high inrush circuit encountered in starting motors. *Square D Co, Detroit, Mich.*

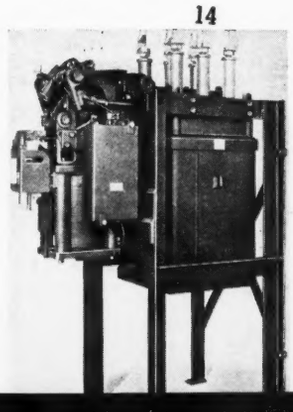
22 LINESTARTER—Designed for ratings up to 2 hp, 220, 440 and 550 volts, for across-the-line starting of squirrel-cage induction motors, and as primary switches for wound-rotor induction motors. Built either as plain across-the-line starters or in combination with motor-circuit switches and Nofuze circuit breaker in standard enclosures. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

23 LOW-VOLTAGE CUTOUT—Rated at 250 volts, 100 amp, with interrupting capacity of 5000 rms amp, unit is for use on low-voltage distribution systems to prevent


11

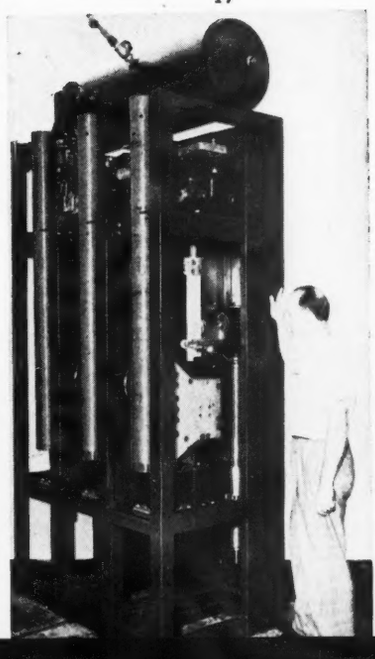

12

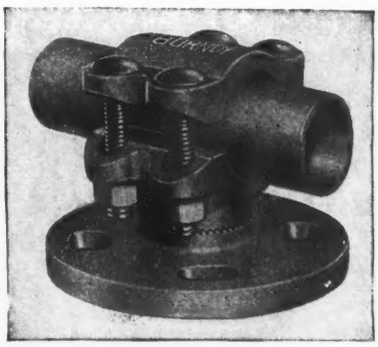

13

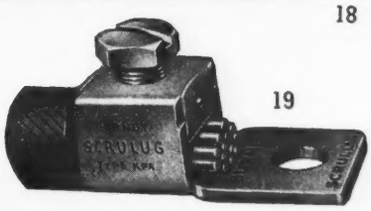

14

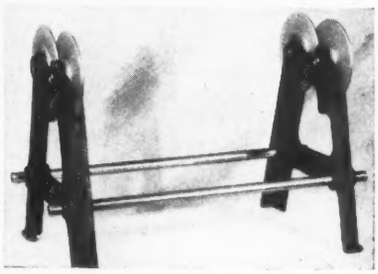
15

16

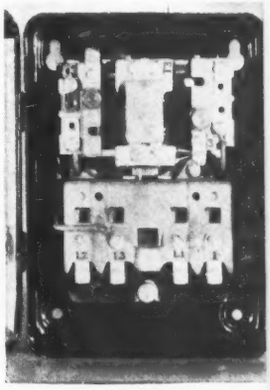

17

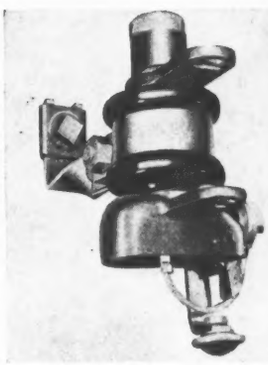

18

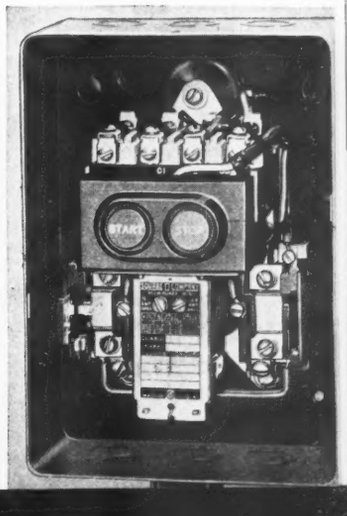

19


20

21


22


23 24



needless transformer failures, to isolate faulty sections in interconnected system of secondaries to prevent overfusing, and to provide convenient means for disconnecting service. Can be fused with standard primary distribution fuse links having button heads, or with links made for secondary service carrying a button head. Blown fuses easily detected by indicator arm with red reflector. *Schweitzer & Conrad, Inc, 4435 Ravenswood Ave, Chicago, Ill.*

24 MOTOR STARTER—Type R, Class 8536 starter has maximum polyphase ratings of 2 hp, 220, 440 and 550 volts; maximum single-phase ratings are 1 hp, 100 volts, or 1½ hp, 220 volts. Has vertically operating magnet, double-brake silver contacts and thermal overload relays. *Square D Co, Detroit, Mich.* *(See previous page for photo.)*

1 LIMIT SWITCH — Small, snap-action limit switch can be easily mounted for operation in practically any position. Enclosed in sturdy die-cast case, drilled to facilitate mounting on either back or side. Silver-to-silver double-break contacts assure long life, while two independent circuits provide any contact arrangement. Gasketed cover and grease seals on push rod and shaft make it oil proof. *General Electric Co, Schenectady, N. Y.*

2 HIGH-VOLTAGE COIL TESTER—This instrument is able to subject coil under test to many times overvoltage. Detector operates while voltage is impressed and thus will detect not only permanent failures but also temporary failures. Operation of testing consists of placing coil over core, closing door and pushing button. If coil fails, indicator will deflect. *General Electric Co, Schenectady, N. Y.*

3 MERCURY SWITCH—Unbreakable, non-inflammable mercury switch said to be only commercial unit available over 40 amp, and up to 200 amp. Claimed to withstand temporary short circuits, to operate with small tilt and little energy. For electrical devices requiring from few contacts a month to 2400 a minute. *Durakool, Inc, Elkhart, Ind.*

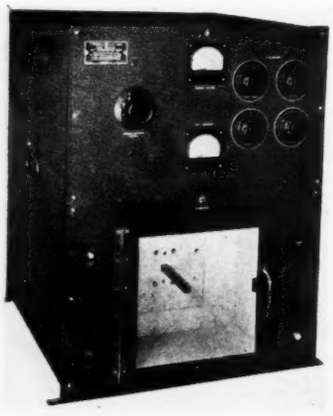
4 COPPER-OXIDE RECTIFIER—Rated 50 amp, 120 volts dc, 220 volts ac, for 2-cycle operation not exceeding four per min, this new unit has been developed to supersede former 3-amp unit, or multiple combination of such units. One of these new rectifiers can replace 16 or 17 units of previous design. Requires less space and eliminates possibility of trouble due to improper balancing or dividing of current through numerous parallel paths. *General Electric Co, Schenectady, N. Y.*

5 GENERATOR-VOLTAGE REGULATOR—"Diactor" unit, for use with ac and dc machines, is available in six ratings for generators rated 15,000 kw, 3600 rpm, and smaller machines at correspondingly lower speeds. Quick-action, wide-range rheostatic regulator contains improved torque element which eliminates pivots and bearings. Self-aligning spring suspension does away with maintenance at this point. *General Electric Co, Schenectady, N. Y.*

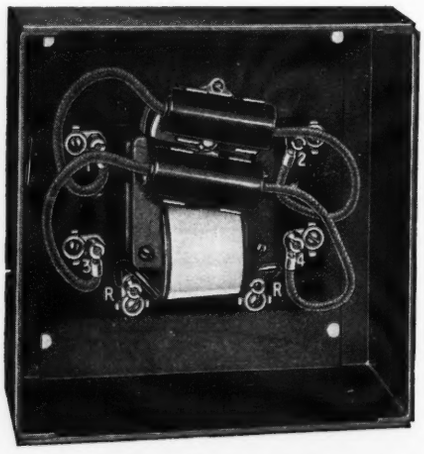
6 EXPLOSION-PROOF DC MOTORS—Recent changes and improvements in enclosed, fan-cooled design make it possible to provide complete range of sizes from 1 to 75 hp. Will operate safely in places made dangerous by gas and vapors produced by methane, acetone, benzene, alcohols, gasoline, etc. *Reliance Electric & Engrg Co, 1088 Ivanhoe Rd, Cleveland, Ohio.*

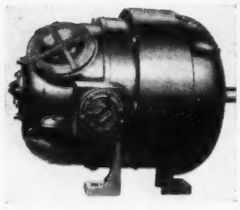
7 GENERATOR RELAY—Type GGP directional undervoltage relay protects gene-

1

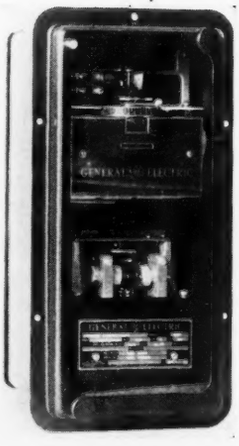

2

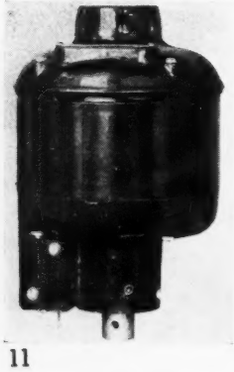
5

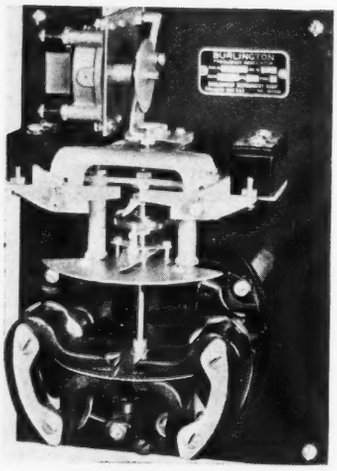

9

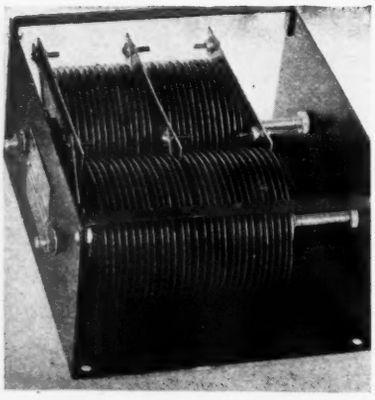

6

3

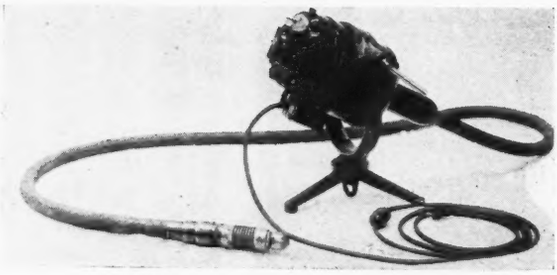

7


11


10


4

8


12

rators against motoring. Combines high sensitivity and nonbouncing features of induction-cup, polyphase, directional element with accurate and adjustable timing of induction-disk undervoltage unit. Unit is compact, housed in 5½x12-in. case. Standard relay has sensitivity of 0.5 per cent of full-load power, *General Electric Co, Schenectady, N. Y.*

8 AC ADJUSTABLE-SPEED MOTORS—"Adjusto-Spede" is combination of eddy-current clutch and standard constant-speed ac squirrel-cage motor. Speed and torque variations are obtained by controlling magnetic excitation of clutch, thereby obtaining any desired slip. Following features claimed by manufacturer; unusually wide range of speed variation from zero to full speed or full load torque; unit can be operated continuously at low speeds without overheating; motor provides gradual or quick acceleration of load, rapid intermittent starting and disconnecting of load, and it absorbs tortional impulses and vibrations. *Louis Allis Co, Milwaukee, Wis.*

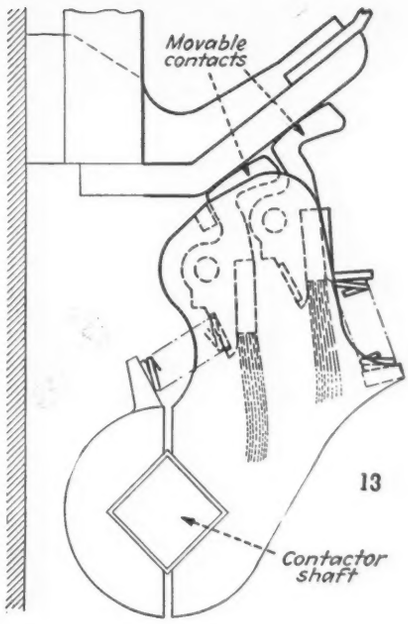
9 ROTATING RELAY—M-39 relay said to be only rotating type employing tilting mercury switch. Magnetic brake dampens movement of switch, making it "dead beat" in action. Mercury switch, attached to rotating disk on armature shaft of magnetic element, is unbreakable. At 115 volts ac, each switch has breaking capacity of 15 amp. *Autocall Co, 28 Mack Ave, Shelby, Ohio.*

10 FREQUENCY REGULATOR—Ac-generator frequency regulator is interposed between outgoing circuit and governor of steam turbine or other prime mover connected to generator supplying outgoing electric circuit, so that any abnormality in frequency automatically acts on control apparatus, causing it to make necessary adjustments. Frequency regulator uses a frequency bridge in form of a resonant filter and this bridge rejects all frequencies, except frequency of generating system. If frequency is higher or lower than frequency desired, directional relay closes one of two sets of contacts, which operates relay to turn governor control motor one way or the other. Claimed to correct frequency variations of 0.01 cycle. *Burlington Instrument Corp, Burlington, Iowa.*

11 SUMP-PUMP MOTOR — Special-resistance split-phase motor for sump-pump service has drip-proof top end shield to prevent entrance of water. Motor is rated ¼ hp, 1725 rpm, 110 volts, 60 cycles. Float switch, low-pressure single-pole type, is built inside motor completely connected to the motor circuit. *General Electric Co, Schenectady, N. Y.*

12 PORTABLE TRANSFORMER TOOL—½-hp motor on short stand drives flexible, rubber-encased shaft, 8 ft long, to end of which can be attached any of the several devices for sanding or grinding. With this tool, hard-to-reach surfaces of radiator coolers and transformer tanks can be easily freed of dirt, rust, scale, etc. Variety of cleaning brushes and other fittings available. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

13 HIGH-CAPACITY MAGNETIC CONTACTOR—Arrangement of blowout circuit permits concentrating magnetic flux where most useful. Contact arrangement allows placing blowout side plates together. Blowout magnetic field kept in phase with arc-path current by laminations on blowout core and side plates. Compact construction obtained by mounting 1-in. wide contacts in tandem, so that top contact makes and breaks before lower contact. Current-carrying surfaces of contacts remain clean even after prolonged interrupting tests. Contactors actuated by vertical plunger solenoid, motion of which transfer to contactor shaft by toggle system that gives maximum speed of contact opening and maximum contact pressure when closed. Rebound at end of opening travel positively prevented. Final breaking of circuit takes place on upper contact toe at point not used when closed. Made in 600- and 1200-amp sizes. *Monitor Controller Co, 51 S Gay St, Baltimore, Md.*



PUSHBUTTON CONTROL—Unit type push-button control station with reinforced Bakelite cover mounted on die-cast frame; single- or double-button models. Cover can be taken out by removing single screw. Mechanism can be removed from frame, and double-break, silver contacts are located in set-back niches. *Allen-Bradley Co, 1311 S First St, Milwaukee, Wis.*

INSULATION TAPE—"Twinsulation" tape, combination friction and rubber, said to be adaptable to all kinds of electrical work. Due to high dielectric strength, less tape applied will suffice where formerly more tape was necessary. *U. S. Rubber Co, 1790 Broadway, New York, N. Y.*

CLAMP AMMETER—Weston clamp ammeter permits measurement of ac current without breaking circuit. Has 6 ac ranges from 0 to 500 amp, will hold conductors up to 2-in. diameter, and has 6-position switch. Laminated clamping jaws insulated with heavy rubber sleeve said to withstand breakdown test of 10,000 volts, ac, and instrument is available for remote indications. *Weston Electrical Instrument Corp, 11 Park Place, New York, N. Y.*

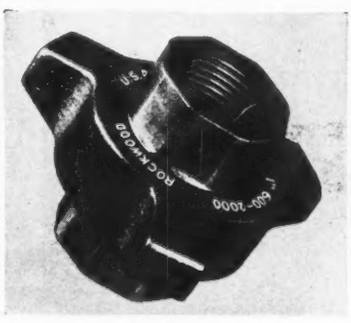
MOTOR PROTECTOR—"Thermoguard" protects against motor failures caused by continuous overloads, jamming of motor or drive, inability to start because of low voltage, etc. Consists of snap-acting concave disks made of dissimilar materials with different coefficients of expansion enclosed within motor. When rising temperature causes disks to snap open, two breaks are produced in series in motor circuit. Reclosing may be either fully automatic, manual, or automatic after definite time interval. *Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.*

MOTOR-PUMP UNIT—"Motoair" can be installed in normal mountings, or upon walls and ceilings. Does not have usual air chamber, but either vacuum or pressure is built up without pulsation or vibration. Visible oil control and filter designed to eliminate spraying of oil that frequently causes spoilage by soiling when pump is run intermittently. Made in many sizes for all standard variations in electrical service. *New Jersey Machine Corp, Hoboken, N. Y.*

PIPING, FITTINGS AND VALVES

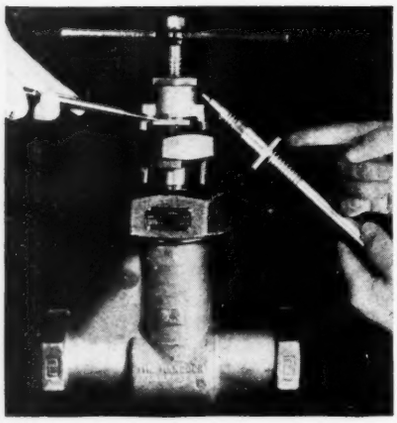
1 HAMMER LUG UNION—Special-alloy-steel hammer lug union is of 85,000-lb tensile steel, corrosion resistant. Triple-lug nut provides greater convenience in making up or breaking connections. No wrenches needed; lugs may be hit with hammer, iron bar or anything handy. One of three lugs is always in position to be struck. Made for 600-lb WSP, 900 F, or 2000-lb hydraulic. *Rockwood Sprinkler Co, Worcester, Mass.*

2 WELDING FITTING—"WeldELLS" have annular lip forged integral with fitting, said to eliminate need for backing rings, clamps and guides to hold material in position. Ring stays cooler during welding operation than sides of pipe, therefore making opening darker and aiding welder determine when complete penetration, without burning through, has been accomplished. WeldELLS are full pipe thickness throughout with reinforcements in parts of stress. Also have tangents, machine-tool bevels, ends marked in quarter sections, and name, size and weight rolled into each fitting. *Taylor Forge & Pipe Works, P O Box 485, Chicago.*



1

2



3

3 STEEL VALVES—Principal improvement in line of forged- and cast-steel valves is new material for renewable stem-thread bushing—Duronze, aluminum-copper-silicon alloy. Maker claims that with new bushings, valve will operate satisfactorily without lubrication of stem at elevated pressures and temperatures. *Hancock Valve Div, Manning, Maxwell & Moore, Inc, Bridgeport, Conn.*

4 VALVE ACTUATOR—"Multi-power" hydraulic valve actuator said to provide positive opening and closing on globe, gate, butterfly, rotary plug, and other similar valves. Non-inflammable fluid can be used in hydraulic system, and weather- or explosion-proof motors supplied on order. *Automatic Temperature Control Co, 34 E Logan St, Philadelphia, Pa.*

5 ELECTRICALLY OPERATED VALVE—No. 1100 valve, with safety-torque-limit device, prevents damage to power unit should obstruction lodge in valve and prevent it from seating. Also provided with means of manual operation in case of power failure. Will operate in any position at 110 volts, ac or dc, with brush-type motor. Furnished in all sizes up to 6-in., both single- and double-seated, flanged or screwed. *McAlear Mfg Co, 1901-09 S Western Blvd, Chicago, Ill.*

6 REDUCING VALVE—Type 57U union-end regulator can be used with water, steam, air, oil or gas. Type illustrated is spring-actuated and can be installed with diaphragm above or below pipeline. Available in Duromite bronze or stainless steel, and V-port or throttling inner valve furnished on order. Sizes from ½- to 2-in., screwed globe, union end, all bronze body, for pressures of 250 lb and 450 F. *Fisher Governor Co, Marshalltown, Iowa.*

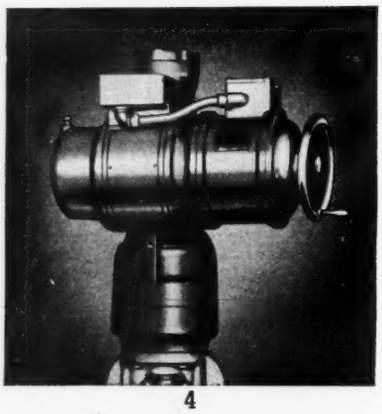
7 AUTOMATIC AIR VALVE—"Airliner", adjustable, venting, automatic air and vacuum valve for steam system, provides advantages of 2-pipe system to ordinary 1-pipe gravity system. When system is "fired up", unit removes air from radiators and closes when steam reaches it. When steam condenses, creating vacuum, unit seals radiators and holds vacuum. This causes low-pressure steam or vapor to continue to circulate throughout heating system. *Jas P Marsh Corp, 2073 Southport Ave, Chicago, Ill.*

8 PIPE BENDER—"Porto-Power" pipe bender handles 7 sizes of pipe, up to 4-in. diameter. Comes in two sizes, larger sizes using 20-ton hydraulic unit, smaller sizes 10-ton ram. Pivot shoes on larger model have wide rims, which act as wheels for rolling along on smooth surfaces. *Blackhawk Mfg Co, Milwaukee, Wis.*

9 DRAINERS—External cage-type drainers used for continuously removing large quantities of condensate under high pressures from heaters, separators, etc. In hookup illustrated, seal of condensate is carried in drainer. As discharge increases, level will rise in pipe *A*, causing drainer float to rise, opening drainer valve to accomodate greater rate of discharge. *Cochrane Corp, 17th & Allegheny Ave, Philadelphia, Pa.*

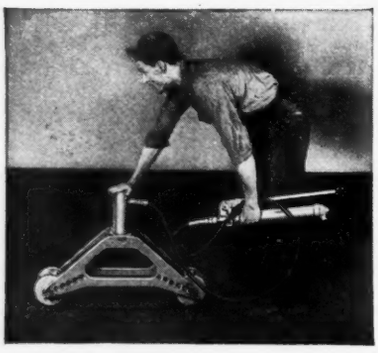
10 GAS VALVE—Model V155 has "locking screw" which, after removal, allows gas valve to close under control of thermostat, should damper arm bind and fail to close, but will not allow it to open until damper has been repaired. Sizes from ¾ to 2½ in. for ac current only, and for gas pressures not over 4 oz. *Minneapolis-Honeywell Regulator Co, 2950 4th Ave, Minneapolis, Minn.*

11 REVOLVING JOINT—"Barco" revolving joint constructed to supply, steam, gas or other fluids from stationary supply pipe to rotating drum or member, without leakage.

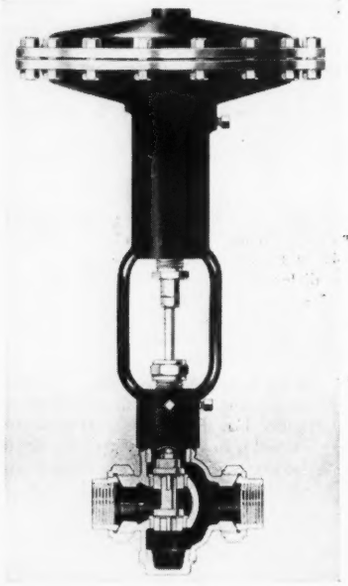


4

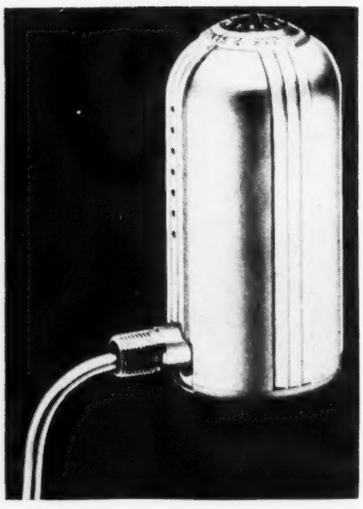
5



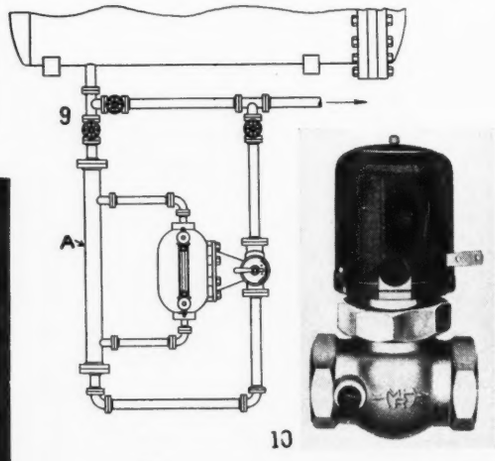
8



6

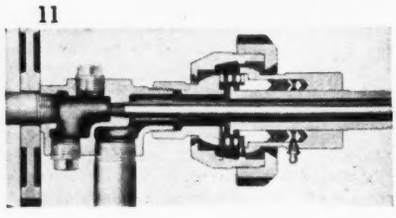


7



9

10



11

Rotating sleeve is only part of joint which revolves, also sliding in or out to compensate for any end play in revolving drum. *Barco Mfg Co, 1801-1815 Winnemac Ave, Chicago, Ill.*

12 INVERTED-BUCKET STEAM TRAP—Type BS inverted bucket-trap now made for pressures up to 900 lb psi. Body and cover are high-grade steel forging of a shape to give maximum strength. All interior parts, including bucket, are stainless steel. Hardened stainless alloy used for renewable valve seat and disk. *Sarco Co, Inc, 183 Madison Ave, New York, N. Y.*

13 BRASS VALVES—Line of 3-way brass lift-plug valves, for pressures to 150 lb and temperatures below 400 F, made in sizes from 1¼ to 1¾ in. Direction of flow is changed by quarter turn of operating lever. *Homestead Valve Mfg Co, Coraopolis, Pa.*

14 VALVE POSITIONER—Diaphragm-control-valve positioner overcomes effect of friction in valve stem and top. Valve positioner assures proportionate valve-stem travel for even slightest change in pressure of air from controller. *Bristol Co, Waterbury, Conn.*

15 PIPE THREADERS—"Rigid" No. 65R and 85R series of pipe threaders made of all steel and malleable alloy, with drop-forged hardened-tool-steel cam plates. These tools thread four sizes of pipe,—1, 1¼, 1½ and 2 in.—with one set of chaser dies. *Ridge Tool Co, Elyria, Ohio.*

16 SNAP-ACTION AIR TRAP—Automatic mechanical trap said to have these advantages: immunity to ordinary dirt conditions, ability to discharge water without loss of air, positive opening and closing of discharge valve, and freedom from need for priming. Has capacity of 1400 lb of water per hr at 125-lb pressure, and 100 lb per hr at 200-lb. *Armstrong Machine Works, Three Rivers, Mich.*

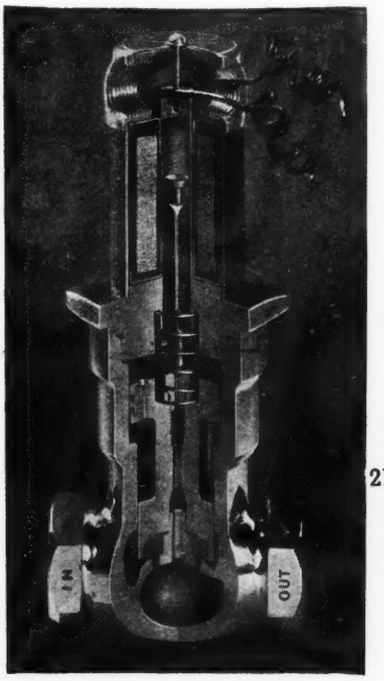
17 BALL-BEARING SWING JOINTS—Double rows of steel ball bearings carry radial load and keep packing element compressed by maintaining preregulated thrust upon it. Each joint gives full circle rotation without binding. *Chiksen Oil Tool Co, Ltd, Fullerton, Calif.*

18 AIR RELEASE VALVE—"Silvertop" consists of valve, seat, lever and ball float inside of case. Liquid raises float and holds valve closed and accumulation of air or gas lowers liquid level, causing float to drop. This opens valve and vents air or gas. Standard model available in six sizes, from ½ to 2 in., for pressures up to 250 lb psi. Other models built for pressures up to 1000 lb. *V D Anderson Valve Co, Cleveland, Ohio.*

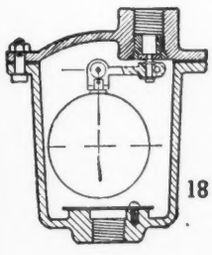
19 VALVE OPERATOR—Type JS Limitorque valve operator consists of motor-driven combination helical-and-worm-gear reducing mechanism which bolts to a pad on side of valve yoke. Lost-motion device built into machine allows motor to attain full speed before stem load is encountered. This produces a "hammer blow" at valve stem which unseats or starts valve in motion. *Philadelphia Gear Works, Erie Ave & G St, Philadelphia, Pa.*

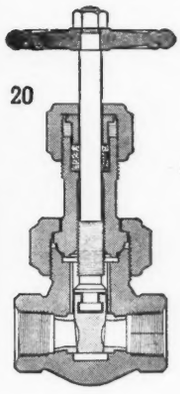
20 GATE METER VALVES—Drop-forged-steel gate meter valves are union bonnet, ground joint, inside screw-stem type with removable rolled-in seats and loose, slotted gate. Made in sizes of ¼-, 3-8, ½-, and 1-in., of carbon steel with stainless-steel trim or all stainless steel. *Henry Vogt Machine Co, Louisville, Ky.*

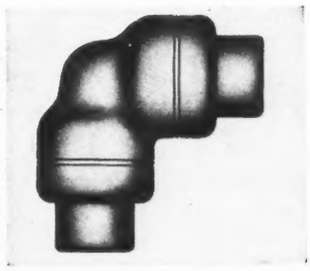
21 ELECTRIC VALVE—"Atkomatic" valves adaptable for difficult continuous opera-



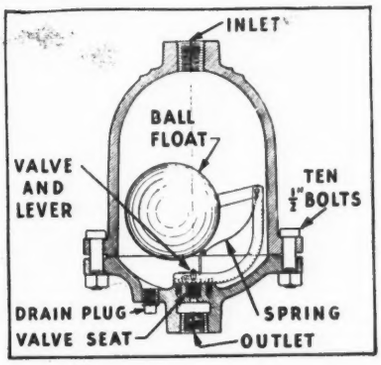
21


18

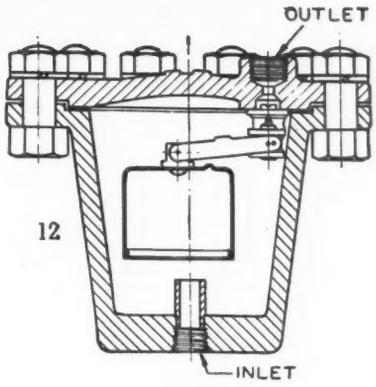

20


17

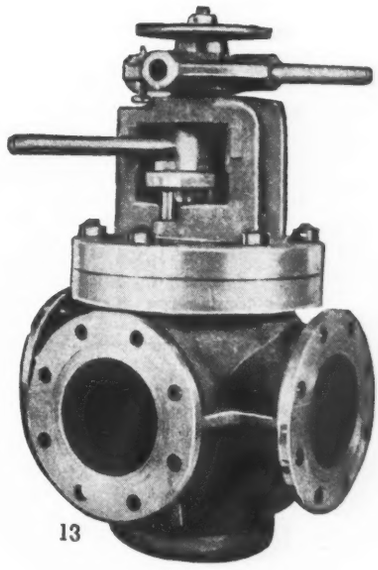
19

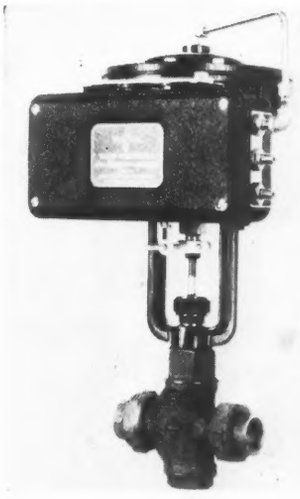


16



12


13


14

15

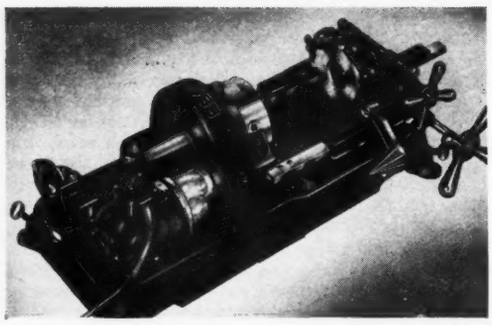
tion on steam up to 150 lb, and where accuracy of operation is desired. Has only three movable parts. Non-metallic valve disks said to insure maximum wear and tight-seating for each particular service. Plunger is corrosion resistant, and all parts are stainless steel or bronze. *E C Atkins & Co, 452 S Illinois St, Indianapolis, Ind.*

1 PIPE-THREADING MACHINE—Model B pipe and bolt machine handles ⅛- to 2-in. pipe. Features include: quick-opening adjustable ring-type dieheads, right-hand operation, rack-and-pinion feed, adjustable pipe support (independent of spindle) absorbs pipe "whip" and prevents flat-sided threads. *Beaver Pipe Tools, Inc, Warren, Ohio.*

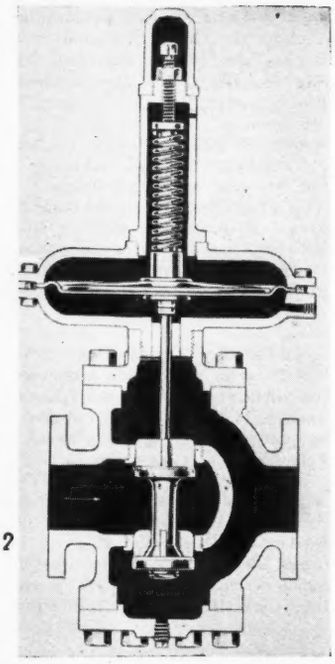
2 REDUCING VALVE—Type 217AS transmits reduced pressure after receiving higher or varying pressure on inlet side. Unit is spring actuated and has no dashpots or pistons. Valve stem is guided into diaphragm casing and connected to inner valve by "Flexaline" connection. *Fisher Governor Co, Marshalltown, Iowa.*

3 HYDRAULIC REVERSIBLE VALVE—Reversible valve is used with pump and continuous reciprocating, double-acting cylinder motion. It operates one or more cylinders in parallel; on a closed circuit, cylinder with least resistance moves first, followed by each cylinder in order of resistance. *A* is pressure-regulating screw, *B* is connection from circulating pump, *C* are connections to cylinder or cylinders and are alternate discharge and return. *Seward & Walcutt, 189 Montague St, Brooklyn, N. Y.*

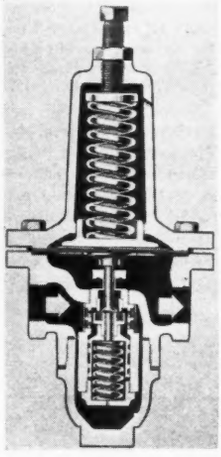
4 STEEL VALVES — "No-bonnet-joint" valves, made for pressures up to 2500 lb, 1000 F. When this valve is welded in line, only joint is that of stuffing box for stem. Maker claims that leakage through threads between valve seat ring and valve body can never occur. Valve has no threads, Stellite seat is welded to valve body. Valve disk is also heavy Stellite to resist wire-drawing and wear. Made in one basic size and then tapped



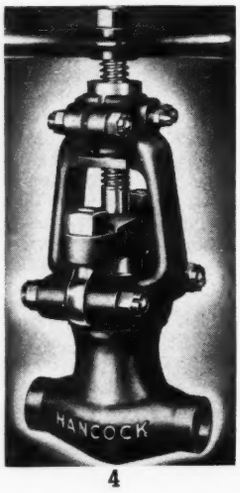
1



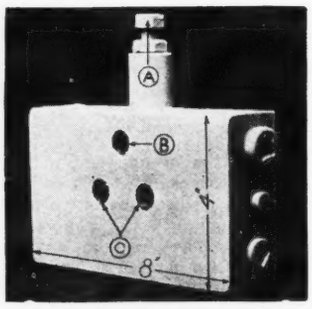
2



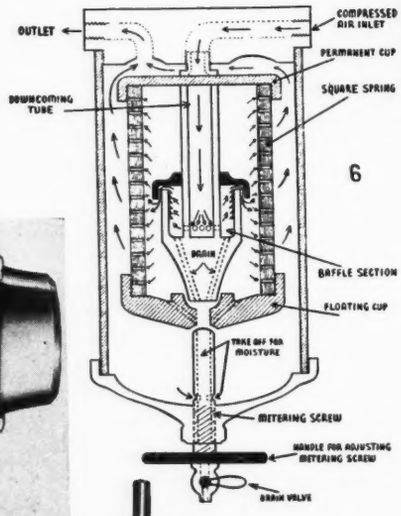
5



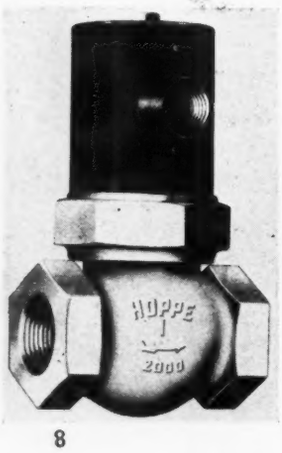
4



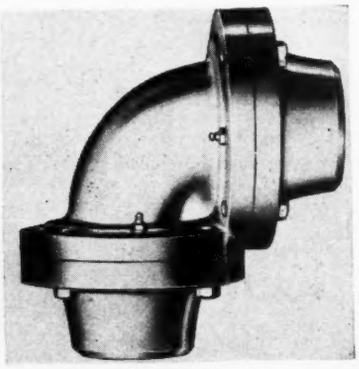
3



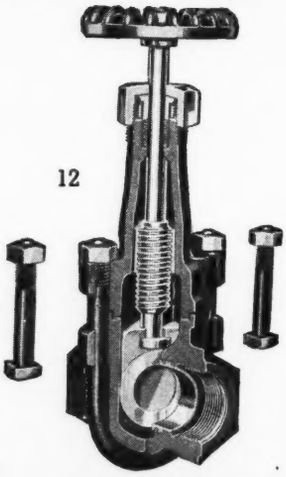
6



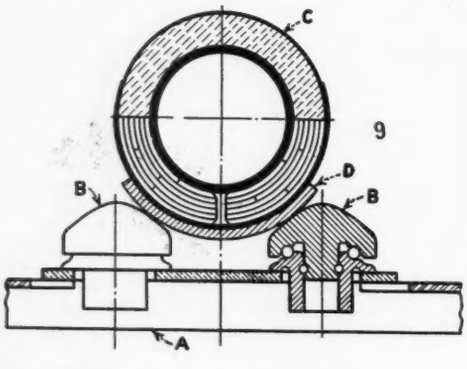
8



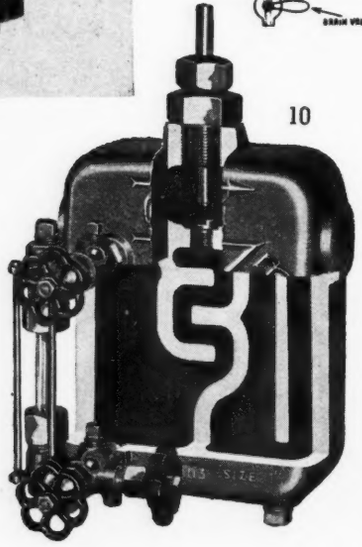
7



12



9



10

11

or bored for welding, for ½-, ¾- and 1-in. pipe. *Hancock Valve Div, Manning, Maxwell & Moore, Inc, Bridgeport, Conn.*

5 REDUCING VALVE—Type BB self-contained valve can be had with either bronze or high-tensile bodies. Either laminated stainless steel or composition diaphragms can be furnished. Calibrated steel springs plated against rust or corrosion permit easy throttling control over reduced pressure range. *Fisher Governor Co, Marshalltown, Iowa.*

6 MOISTURE SEPARATOR — "Stevens" Model B-12 provides positive filtration through correct design of baffling, together with edge-pressed coils of square spring. Through coils regulated by metering screw; ranges from 0.002 to 0.010 in. Capacity is 120 cfm at 100-lb pressure. *Master Metal Spray Co, 2527 Magnolia St, Oakland, Calif.*

7 STEEL SWING JOINT—"Champion" all-steel joints give 360-deg rotation in 1, 2 or 3 planes, for all pressures up to 5000 lb. Low-pressure joints are drop-forged steel castings, tested for 500-lb water pressure, and are leakproof. Feature of both high- and low-pressure joints is straight fluid course, which eliminates all abrupt shoulders. Available in three different types, in sizes from 2 to 8 in. *H & B Sales Co, Ltd, 2875 Cherry Ave, Long Beach, Calif.*

8 SOLENOID VALVE—Type D made of bronze, suitable for pressures up to 150 lb steam, 400 lb gas and liquid. Coils are impregnated to resist moisture. When electric pilot valve is closed, line pressure forces piston down, closing valve. When pilot valve is electrically energized, it opens and releases pressure above piston. This area is greater than valve opening, permitting line pressure to force piston up, opening valve. *Hoppe Engineering Co, Indianapolis, Ind.*

9 BALL-BEARING PIPE SUPPORT—Ball-bearing cones as pipe supports consist of horizontal piece *A* carrying two conical rollers *B*, with supporting surface cast with vertical pin guided in bearing sleeve. Ball bearing permits free rotation for any longitudinal motion of pipe, and flange seals out dirt. Cast-iron shoe *D* is fastened to semi-circular section of laminated insulation, reducing heat loss. *United Engineering Co, Ltd, San Francisco, Calif.*

10 STEAM TRAP—Improved model of "Drainator", which has no moving parts, includes several new features. Now has stainless-steel stem and orifice, gage glass specially designed for extensive service, and high-pressure packing to prevent erosion of glass. Main casting more rugged, with streamlined interior; blowdown valve is built into gage glass fitting; shutoffs are provided on each fitting. *Coe Mfg Co, Painesville, Ohio.*

11 SIGHT GLASS FOR PIPELINES—Visible-flow fitting, for pressures up to 125 lb psi, is made in six sizes for 2½-, 3-, 4-, 5-, 6- and 8-in. lines. Body is of cast iron and window frame of steel. Windows are Pyrex glass. *Cochrane Corp, 17th St & Allegheny Ave, Philadelphia, Pa.*

12 U-BOLT GATE VALVE—"Duo-Bolt" valve has U-bolt replaceable with standard stock bolts and large drain duct to allow fluids to flow back into body when piping operations are discontinued. Also has self-seating, horseshoe-shaped, slip-on wedge available in malleable iron or steam bronze. *Ohio Injector Co, Wadsworth, Ohio.*

CONTINUOUS BLOWDOWN VALVE—"Anum-Metl" seats and disks feature this valve designed for severe conditions. Seats have been made hard without sacrificing toughness. Tests are said to have shown that its taper, throttling-type seats and disks, and metering dial permit easy and accurate control. *Strong, Carlisle & Hammond Co, Cleveland, Ohio.*

INSULATED PIPE UNITS—Metal conduit system is self-contained system of assembled units including steam pipe, supports, insulation, metal conduit housing, and all accessories, delivered in prefabricated form ready for welding. Conduit is spirally corrugated heavy gage pipe of ingot iron, asphalt-coated. Units supplied for either single or multiple pipelines in standard 20-ft lengths, insulation is 85 per cent asbestos. *Ric-wiL Co, Cleveland, Ohio.*

GATE VALVES—No. 422 and 423, 200-lb brass valves are made with wedge disk, union bonnet and rising steam, and are identical except for body. No. 422 has seats cast integral with body, and No. 423 has renewable body seat rings. For steam, water, oil or gas, in sizes from ¼ to 3 in. *Crane Co, 836 S Michigan Ave, Chicago, Ill.*

PUMPS

1 GLASS PUMP—Constructed of Pyrex heat- and shock-resisting glass. Pump impeller and casing not affected by temperatures up to 150 F, in standard design, and 200 F in special design. Fully transparent, interior of pump and materials being handled can be seen at all times. Dangerous pressure relieved automatically if it should develop on interior of pump. *Nash Engineering Co, South Norwalk, Conn.*

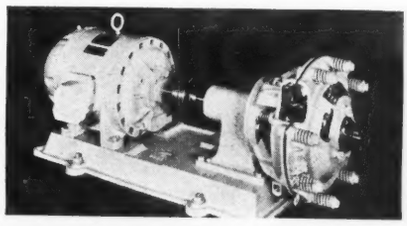
2 MOTORPUMP—"I-R" motorpump built in sizes for delivery of 5 to 1000 gpm and heads up to 500 ft. Pump impeller mounted directly on shaft of electric-motor drive. Entire unit enclosed in housing which requires no baseplate or foundation and may be bolted down for operation in any position. *Ingersoll-Rand Co, 11 Broadway, New York, N. Y.*

3 PUMP GOVERNOR—Type SL, spring-loaded, designed for steam-driven reciprocating pumps or centrifugal pumps driven by small turbines, is used for excess-pressure service on boiler-feeding where maximum excess pressure is more than 75 lb psi, and for constant-pressure service where controlled pressure does not exceed 75 lb. Made in ¾- to 3-in. sizes, 250- and 300-lb pressure standards only. *Northern Equipment Co, Erie, Pa.*

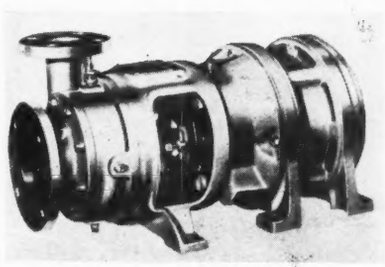
4 PUMP GOVERNOR—Type 445 designed to maintain differential pressure setting of a system by relieving excess pressure in discharge back to suction side. Governor is installed in line connecting pump discharge with suction and is suitable for differential pressures ranging from 10 to 100 lb psi, and for working pressures up to 1000 lb, 100 F. *Fisher Governor Co, Marshalltown, Iowa.*

5 HYDRAULIC PUMP—Capacities of 50, 90, and 200 gpm offered in line of hydraulic units. 200-gal. size illustrated has inner radial roller bearings on rotor shaft, and thrust is carried on duplex outer ball thrust bearing locked against shoulder on rotor shaft. All pumps have right-hand port, except 200-gal. size, in which port can be changed from right to left by removing bolts from back flange. *Viking Pump Co, Cedar Falls, Iowa.*

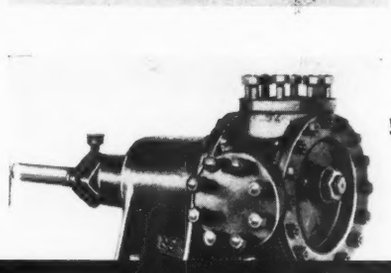
6 ROTARY PUMP—"Rotapiston" unit comprises two reciprocating pistons at right angles to each other, in two rotating cylinders. Each piston is double-acting to give continuous flow. Pistons are mounted on an eccentric so that when shaft rotates, pistons are moved back and forth in cylinders so whole rotor revolves. Adapted for operation at 100 to 1800 rpm in sizes of 0.5, 1 and 2 gpm per 100 rpm. *Globe Products Co, Cleveland, Ohio.*



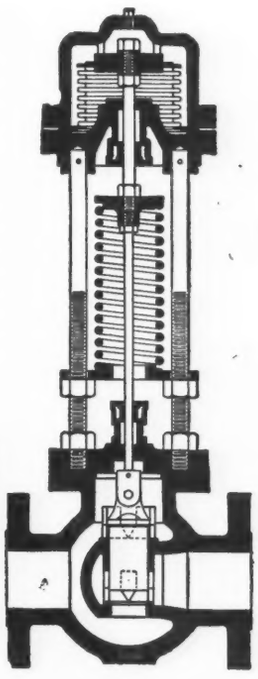
1



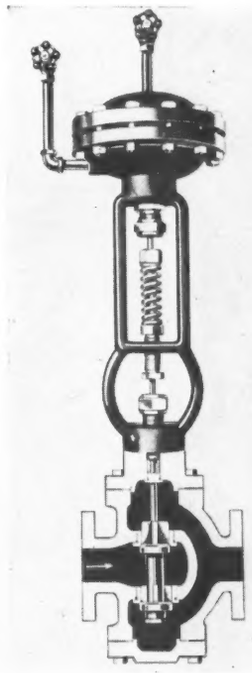
2



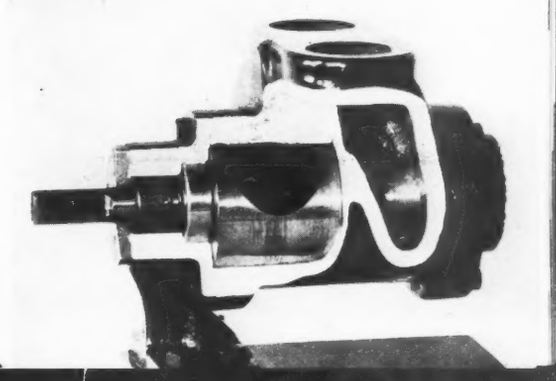
5

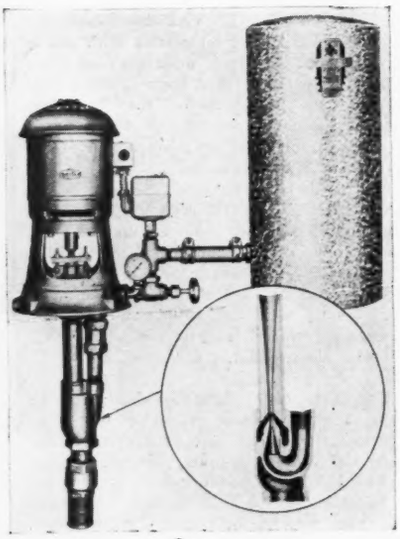


3

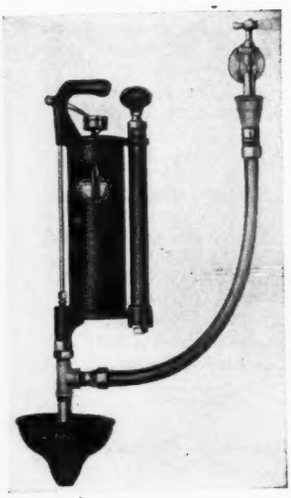


4

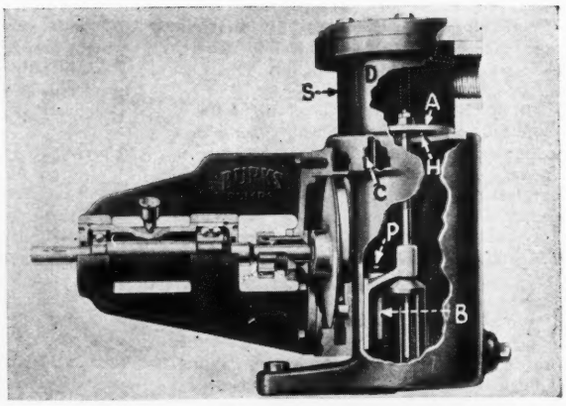




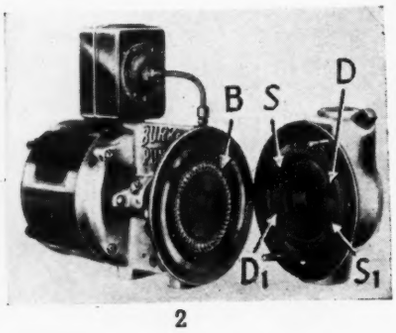
1



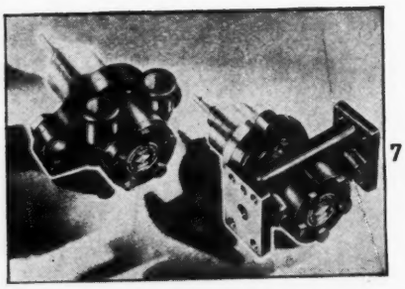
6



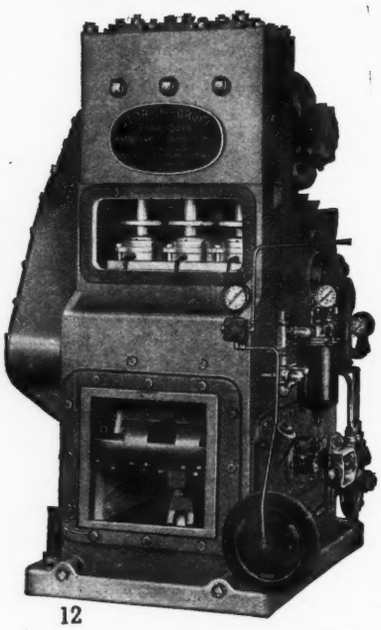
11



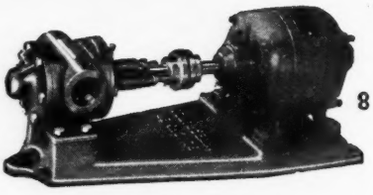
2



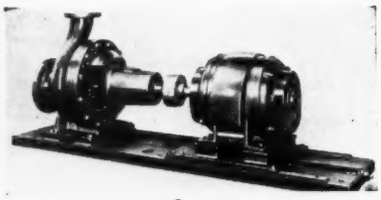
7



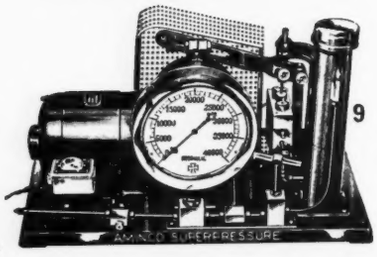
12



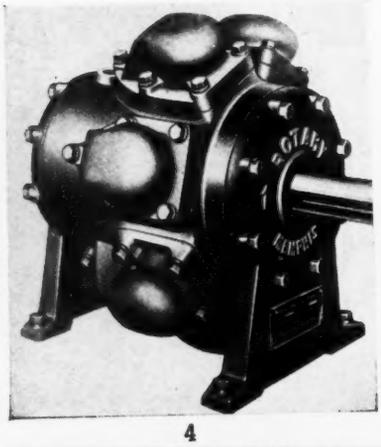
8



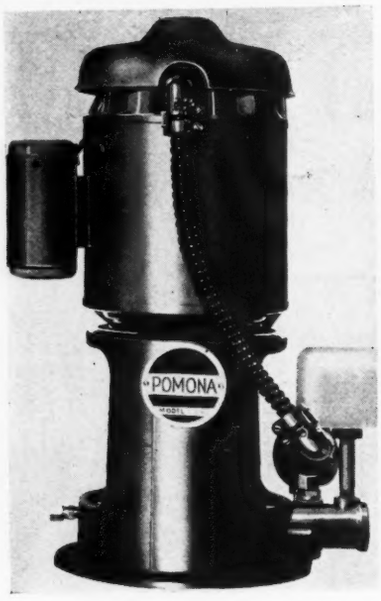
3



9

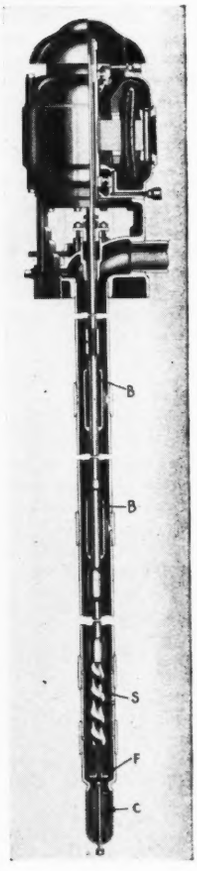


4

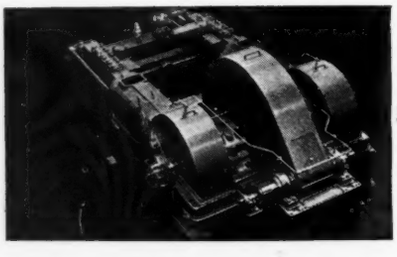


10

14



13



5

1 JET PUMP—Deepwell jet pump made in sizes ⅓ to 1 hp, with wide-range gallonage capacities for industrial plants. Pump is machined from single bronze casting, and is driven by vertically mounted capacitor motor. Direct motor-to-pump hookup said to minimize operating noise and provide steady, non-pulsating stream of running water. *Westco Pump Div, Micro-Westco Inc, Bettendorf, Iowa.*

2 TURBINE PUMP — Originally designed with single inlet and outlet to and from runner, Burks turbine pump now built with two to give increased capacity with same head. Curved buckets *B* are inserted in groove in one side of bronze impeller between two rows of annular grooves, or sealing rings. These grooves match similar grooves in bronze suction and discharge plate. Between two rows of grooves in suction discharge plate, a semi-circular channel extends from suction parts *S* and S_1 to discharge parts *D* and D_1. Matching of grooves in impeller and stationary element forms two sections of a closed raceway in which buckets accelerate fluid and discharge it at high pressure. *Decatur Pump Co, Decatur, Ill.*

3 CENTRIFUGAL PUMP—Type PO single-suction, open-vane-impeller centrifugal pump is much like type SSOR open-runner pump. In addition, new pump is designed so that its rotating element can be readily withdrawn from casing without disturbing suction- and discharge-piping connections, or alignment of pump and motor which are mounted on common base. *Allis-Chalmers Mfg Co, Milwaukee.*

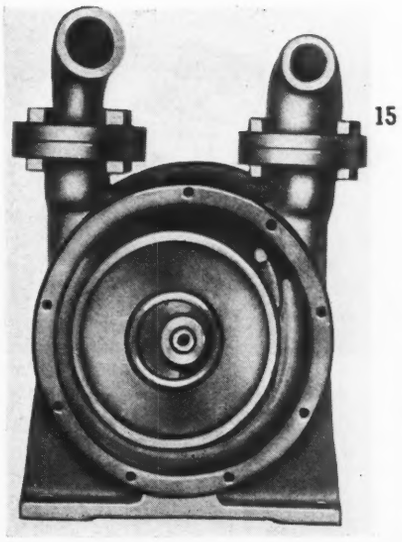
4 ELEVATOR PUMP—"Rota-Radial" pump used on oil- or water-driven hydraulic elevators, said to have efficiency over 85%. Built with 7 cylinders operating from an eccentric. Other features claimed include: practically no slipping, resulting in better speed control, and ability to start and stop smoothly with or without elevator load. Motors of smaller hp used because of these features. *Rotary Lift Co, Memphis, Tenn.*

5 SYNCHRONIZED PUMP CONTROL — Synchronized unloading and loading device developed for automatic delivery control of high-pressure reciprocating pumps. Suction-valve-controlled, air-actuated, new mechanism guarantees quick but gradual decelerating fluid delivery from full flow to zero, and vice versa. In either case, action is same and time required for fully loading or unloading any type of multi-plunger reciprocating pump, horizontal or vertical, duplex, triple, or otherwise, does not exceed one-half of one pump revolution. *Worthington Pump & Machinery Corp, Harrison, N.J.*

6 HAND-OPERATED PRESSURE PUMP—said to clear instantly obstructions in sinks, toilets, gas and oil pipelines, etc. Hand-operated side pump develops up to 135-lb air pressure, which is suddenly released by trigger connection. This pressure acts as battering ram against column of water being held, dislodging it. Grease stoppages are eliminated by hot water with air pressure. *Empire State Drain Cleaner Corp, Empire State Bldg, New York, N. Y.*

7 ROTARY PUMPS—"Edco" vane-type rotary pumps present surfaces for engaging underside of vanes to maintain latter in effective spanning positions in order to assure constant and uniform delivery. Pumps are said to be silent, since they are gearless, and are furnished in standard capacities of 13, 20, 45 and 90 gpm at 100-lb pressure on No. 1 fuel oil at room temperature, and 1750 rpm. *Eddington Metal Specialty Co, Eddington, Pa.*

8 ROTARY PUMP—Type DC has maximum capacity of 20 gpm when direct connected to 1800-rpm standard motor, for pressures to 100 lbs. Pump, base and motor form one compact unit. Built in three standard constructions: iron, bronze fitted and all bronze. *Blackmer Pump Co, Grand Rapids, Mich.*



15

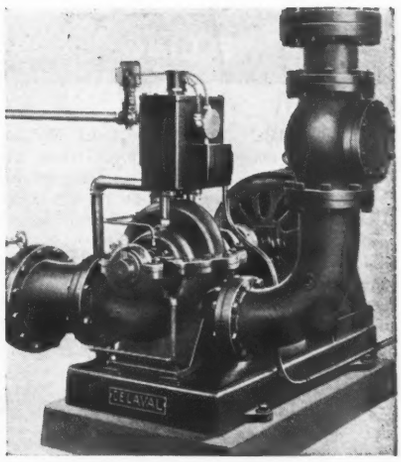
9 HYDRAULIC TESTING PUMP — Motor-driven hydraulic pump capable of developing pressures up to 30,000 lb psi and has dead-weight gage (free piston) for measuring pressure developed. This pump is used for creating high test pressures for determining bursting strength of cylinders and spheres, and for carrying out experiments to determine effect of extremely high pressure and sudden release on various materials. *American Instrument Co, 8010 Georgia Ave, Silver Spring, Md.*

10 JET PUMP—Deepwell unit is made with molded plastic jet, said to be more durable for the purpose than any other material; and claimed not affected by any form of water corrosion. Venturi tube made from molded rubber from which greater efficiency is obtained and excessive wear and corrosion eliminated. One-piece motor and pump shaft provides good alignment and vibrationless performance. For capacities of 180 to 1200 gpm at pressures to 40 lb. *Pomona Pump Co, Pomona, Calif.*

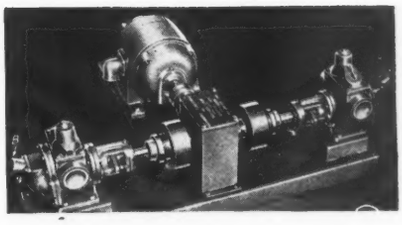
11 SELF-PRIMING PUMP—"Burks" pump starts as self-priming unit and automatically changes to conventional centrifugal operation after it is primed. Built for capacities up to 450 gpm and for total heads up to 130 ft. *Decatur Pump Co, Decatur, Ill.*

12 CONTROLLABLE-CAPACITY PUMP — "Powr-Savr" is reciprocating plunger type built in vertical triplex arrangement with simple mechanical apparatus which governs length of plunger stroke, thus controlling output from zero to maximum. Capacity can be controlled gradually, in stepless straightline fashion, to give any desired delivery. *Aldrich Pump Co., Allentown, Pa.*

13 DEEPWELL PUMP — "Hi-Lift" unit comprises stator *s* made of cutless-rubber cylinder having on its inner rim a helix with twice number of threads as rotor, which is of hard chrome heat-treated stainless steel. Interaction of these two elements as rotor revolves squeezes liquid ahead with positive-displacement action. Shafting connecting pump and driving motor has hard chrome-stainless-steel surfaces in cutless-rubber bearings supported in pipe column. One-piece bronze *c* with rubber-seated foot valve *e* below pump keeps column full of water and no prelubrication is necessary. Available for wells 3-in. diameter and larger, and for heads from 40 to 1000 ft. Capacities begin at 5 gpm. *Peerless Pump Div, 301 West Ave, Los Angeles, Calif.*



16



17

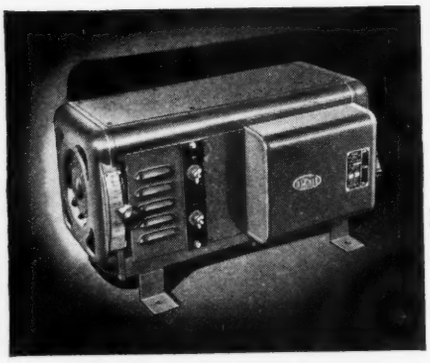
14 WELL PUMPS—K Series shallow-well pumps made in 250- and 375-gal. capacities for horizontal and vertical tank systems. Designed for 40-lb minimum pressure and 22-ft suction lift, having 1-in. suction and ¾-in. discharge. Deepwell pump, D-60, illustrated, has load-balancing cylinder and herringbone gears. Available with different sizes of load-balancing cylinders, giving flexibility to meet operating conditions. *Crane Co, 836 S Michigan Ave, Chicago, Ill.*

15 CORROSIVE-LIQUIDS PUMP—Employs new principle of operation; vacuum first sucks liquid into flexible tubing, then pressure forces it out to discharge side. Tubing, rubber or Neoprene as dictated by liquid being handled, is confined within casing which prevents tube from expanding beyond normal diameter and length. Vacuum created by pump action draws liquid into tubing. Then, liquid is literally squeezed out by pressure applied progressively from intake to discharge end. Pressure on tubing is accomplished by eccentric rotor revolving within circular compressor ring. *Huber Pump Co, 90 West St, New York, N.Y.*

16 PRIMING EQUIPMENT — Constructed for centrifugal pumps located above source of supply, priming system keeps water level on suction side of pump above impeller eye, vacuum-producing device being called on only in cases of exceptional air leakage and when pump is not running. Where main pump is not designed to run dry, or unprimed, it is automatically shut down should break appear in line. When pumps will not be damaged by running dry, slight change in electrical and sealing connections provides for priming while in operation. *De Laval Steam Turbine Co, Trenton, N.J.*

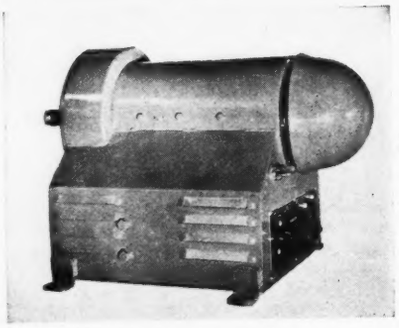
17 BULK-PLANT PUMPING UNIT — Automatic selector twin pumping unit comprises motor and spiral-bevel reduction gear to which two rotary pumps connect through two remotely controlled clutches. These clutches permit operator to connect either pump to gear and motor from loading platform or other suitable place. It is not possible to overload motor because both clutches can not be engaged at same time. *Granberg Equipment Co, Inc, 4068 Holden St, Oakland, Calif.*

WELDING



1

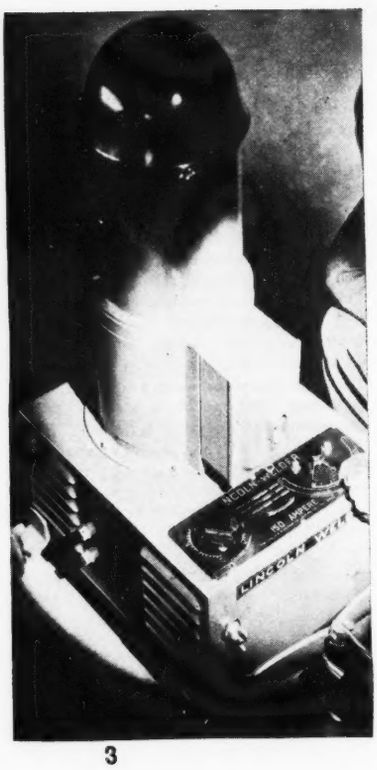
1 MULTI-ARC WELDER — Model WA-200 has two major parts — 1-piece frame and rotating member, all outside attachments removed. Welding range of 40 to 225 amp. Brushes and commutator may be removed for inspection or cleaning and entire welder can fit in less than 3½ sq ft floor space. New type patented frame provides rigid construction, protects against misalignment of bearings, and aids in elimination of vibration. *Harnischfeger Corp, 4400 W National Ave, Milwaukee, Wis.*



2

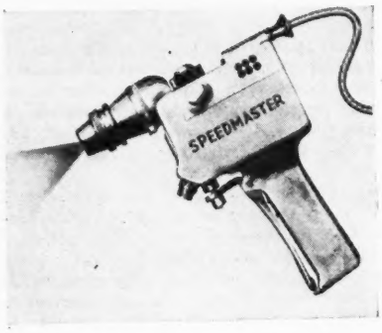
2 ARC-WELDING MACHINE — "Shield-Arc Jr," built for use in conjunction with engine or electric-motor drive, is rated at 200 amp. Equipped with dual continuous control, which permits independent adjustment of voltage and current. *Lincoln Electric Co, 12818 Coit Rd, Cleveland, Obio.*

3 ARC WELDER—Type SA-150 motor-generator arc welder provides more convenience and accuracy because of self-indicating dial continuous current control. Both job selector and current control calibrated and equipped with dials which indicate type of work and number of amps for each setting. Welder has current range of 45 to 200 amp and can be used with either bare- or shielded-arc electrodes. Powered with squirrel-cage induction motor for across-the-line starting. *Lincoln Electric Co, 12818 Coit Rd, Cleveland, Obio.*



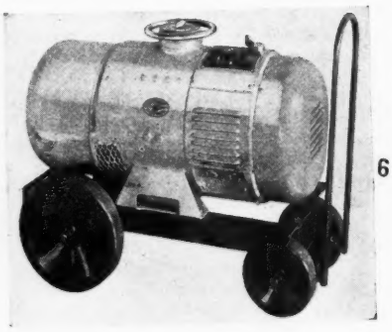
3

4 ARC WELDER—Model 400 BT, 350-amp welder can operate at full capacity continuously and delivers strong arc at any degree of heat. Heat range is from 30 to 350 amp, with separate tap for each of 19 heat-stages. Amperage for each tap marked. Welder has no moving parts and is mounted on truck for portable operation. *Marquette Mfg Co, 409 Johnson St NE, Minneapolis, Minn.*



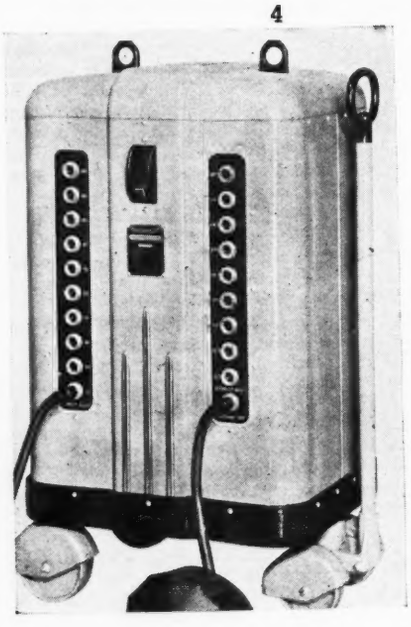
5

5 METAL-SPRAY GUN — "Speedmaster" sprays all metals obtainable in wire or rod form. Has extra heavy bronze gears, and all shafts ball-bearing mounted and self-lubricated. Valves are of the poppet type, synchronized to operate by movement of single lever, and unit has 1-piece wire nozzle, having only one gas joint. *Master Metal Spray Co, 2527 Magnolia St, Oakland, Calif.*



6

6 ARC WELDER—"Hornet" welder is controlled by hand-wheel on top of unit. Adjustments of this wheel enable operator to obtain infinite number of current settings. Unit is 2-bearing, with motor rotor and generator armature mounted on common shaft. Ventilation provided by propeller blades attached to revolving shaft. *Wilson Welder & Metals Co, Inc, 60 East 42nd St, New York, N. Y.*



4

WELDING HOSE—"Twinweld" hose, for conveying oxygen and acetylene for welding and cutting work, consist of two lines of flexible, cord-reinforced welding hose molded into a single unit. Will not kink, writhe or twist under pressure. Hose is installed by splitting it with a knife along joint line at each end to form a Y at both tank and torch ends. Ferrules are then crimped to prevent any further separation. Available in any desired cut length or in continuous lengths as long as 500 ft. *Hewitt Rubber Corp, Buffalo, N. Y.*

ELECTRIC RESISTANCE WELDING PROCESS—Designed primarily for use with stainless-steel tubing and bellows, development permits fabrication of completely sealed vacuum-tight units free from soldered, brazed or torch-welded joints of any kind. Said to be ideal in corrosive atmospheres, where silver solder was formerly used. Automatic equipment makes circumference seam-welding possible without manual operation. Thin gages of metal said to be readily adaptable, and different thicknesses of material can be joined. *Chicago Metal Hose Corp, Maywood, Ill.*

WELDING SURFACE POWDER—"Surface-weld 'A' " is fine-grained alloyed powder to be applied with carbon arc, and said to give smooth, dense, hard surface. When properly applied, will give coating with hardness of approximately Rockwell "C" 54, varying somewhat, depending on amount of admixture with base metal. *Lincoln Electric Co, 12818 Coit Rd, Cleveland, Obio.*

ARC WELDER — "Transarc" welder has no electrical or mechanical connections between power lines and welding leads. Welder has range of 20 to 200 amp and is designed to operate on 220-volt, single-phase power lines. Unit is controlled by large ring, for different welding ranges. Inner switch used to adjust to any arc condition or intermediate steps between outer ranges. *Hobart Bros Co, Box TA69, Troy, Obio.*

STEEL ELECTRODES — "Certified" stainless-steel electrodes feature weld deposit certification instead of wire analysis. Other claims include instant contact upon striking, maximum ease of slag removal, spatter free within practical limits, smooth bead with perfect weld contour, and all alloys contained in core wire. *The McKay Co, York, Pa.*

WELDING BLOWPIPE—Type W-26 blowpipe for heavy-duty welding, forging, pressing, bending, straightening, etc, is for welding and

(Continued on page 130)

They Live With Tops

WITH TWO MORE YEARS' experience behind them, central-station operators of high-pressure, high-temperature installations agreed that most of the causes of trouble in both boilers and turbines had been hunted down and remedies found. Though numerous and in wide variety, trouble reports from 12 plants, all high-pressure, mostly superposed, show that the availability of the new installations averages well over 80%, kwhr generation has been up to expectations and predicted heat economies have been closely attained.

With turbines, the principal troubles have been blade failures in first two rows of the impulse section and accumulation of deposits on blades from carryover. For the first of these, heavier blade and shroud construction has been found one answer; operation without impulse blades or with rearranged admission-valve sequence to avoid intermittent steam shock has furnished another temporary but satisfactory solution. The second condition, blade deposits, has been cared for temporarily by washing blading while in operation with wet steam; the cure has been found to rest in better moisture separation in the boiler drum, already accomplished in many cases.

Principal troubles with boilers and furnaces were reported as (1) poor circulation, resulting in burnouts (2) carryover, creating a serious turbine-blade deposit condition, and (3) slagging of furnace-wall, boiler and superheater tubes. According to E G Bailey of Babcock & Wilcox Co, the first two no longer are serious problems to the boiler manufacturer; the last will require more experience data in view of the many coals that must be burned.

Hydrogen-cooled-generators have caused no troubles after the closed cooling systems are once made tight against leaks. Hydrogen consumption runs around 40 cu ft per day in most cases, considerably less than early consciously pessimistic estimates.

J C Falkner, Consolidated Edison of New York, reported changes in the method of introducing makeup, watching water level, adding chemicals and sampling water and steam at Waterside. System conditions require, he said, operating 52 low-pressure boilers

(*Continued on page* 94)

J C Falkner—"Two Waterside units have been available 75% and 95% of the time, respectively. Two more are on order"

A E Grunert—"The Fisk unit now is to us just another turbine on the system"

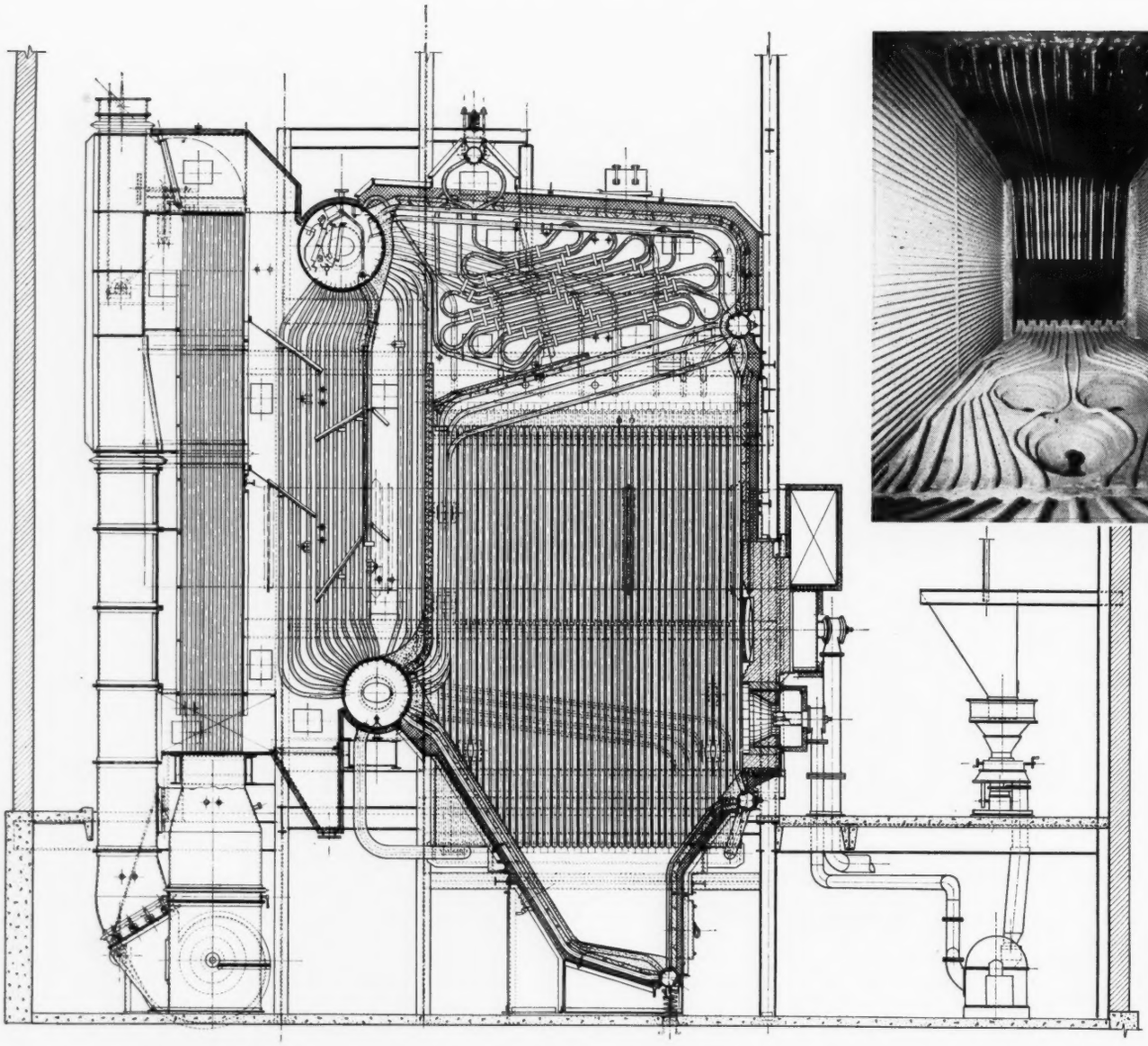
Philip Sporn—"New installations at Windsor and Mishawaka are the logical outcome of experience at Logan and other stations"

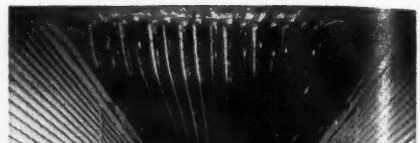
S B Flagg—"Furnace slagging and turbine-blade fouling are being fought continuously at Omaha, but conditions are now tolerable"

C C Baltzly—"Schuylkill unit has operated over 80% of the first year"

J F Muir—"Despite turbine-blade and slagging troubles at Springdale and Rivesville, records show 82-85% availability"

87.3% efficiency





Union Public Service Company, Canby, Minn.

75,000 lbs./hr. Riley RP Boiler Unit
Fired with Riley Pulverizers and Burners
Steam Pressure—500 lbs.
Steam Temperature—825°F
Furnace Volume—4,400 cu. ft.
Heat Release—24,300 B.T.U.
Coal—Illinois—11,973 B.T.U.

	Guaranteed Performance	Actual Performance
Pounds of Steam per hour	50,000 lbs.	42,800 lbs.
Temp. Flue Gas leaving boiler	580°F	554°F
Temp. Flue Gas leaving air heater	350°F	354°F
Temp. Air entering air heater	100°F	98°F
Temp. Air leaving air heater	415°F	446°F
Total Draft Loss	1.60 in	1.14 in.
Efficiency	85.7%	87.3%

Fuel Economy Engineering Company, St. Paul, Minn., General Contractor—Ralph D. Thomas & Associates, Engineers

TRADE MARK Rx REGISTERED

RILEY

STOKER CORPORATION, WORCESTER, MASS.

Boston New York Philadelphia Pittsburgh Buffalo Cleveland Detroit Tacoma Baltimore Milwaukee Denver
St. Louis Cincinnati Houston Chicago St. Paul Kansas City Los Angeles Atlanta Memphis New Orleans

It will pay you to visit modern Riley Installations

from this RILEY Boiler Unit

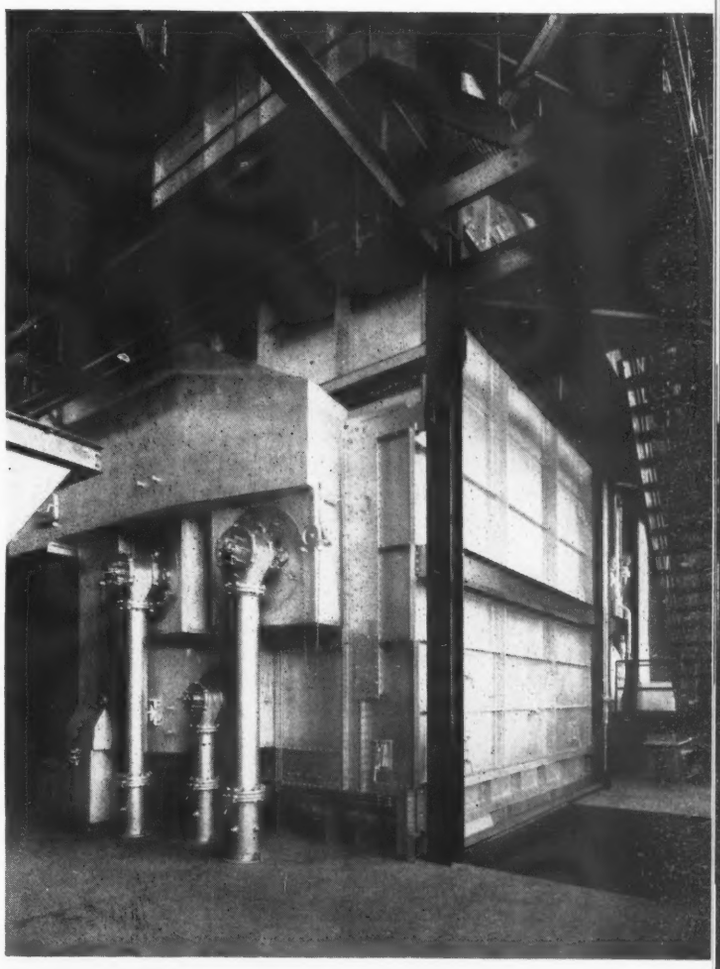
Again, at Union Public Service Company, Canby, Minn., Riley Boiler unit performs better than guaranteed.

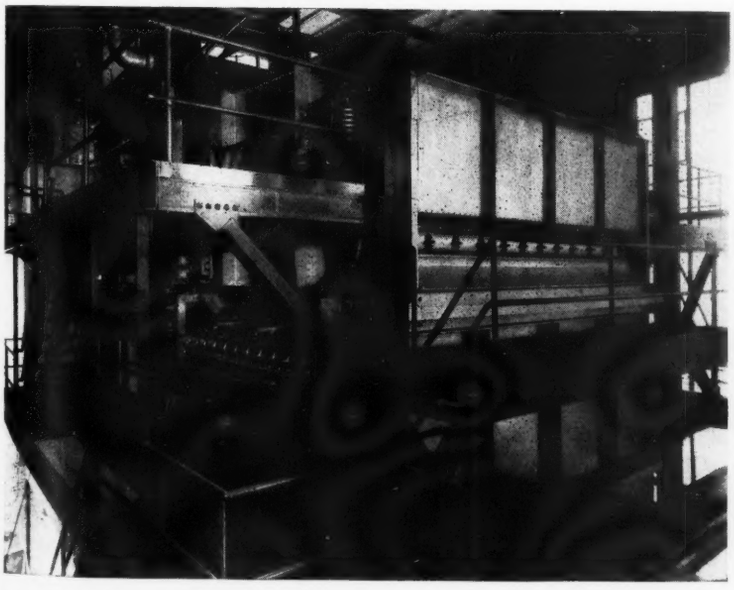
If you want to see a truly outstanding boiler unit visit the Riley installation at Union Public Service Company, Canby, Minn. Here is a unit which operates at 87.3% efficiency though guaranteed efficiency was only 85.7%—which though having a maximum capacity of 75,000 pounds of steam per hour, maintains low loads of 15,000 pounds per hour with absolute ease and ignition stability—and which burns Illinois coal without slagging, the ash being entirely granular in form.

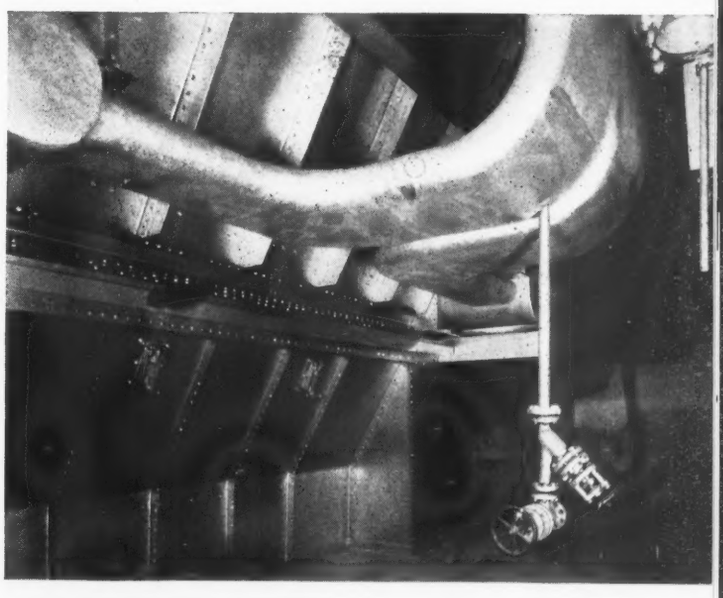
The excellence of construction while shown to some slight degree by the accompanying photographs, will really greatly impress you when you visit this installation. The steel casing is not only good to look at but forms an absolutely gas and air tight closure which will stay tight over years of operating service.

The unit went into service without any of the minor growing pains which engineers have come to expect in connection with some types of steam generating units. These remarkable results were obtained from the moment the unit went on the line without the necessity of design changes. This is perfectly evident from the fact that the unit was fired up initially on July 29th, A.S.M.E. tests conducted September 6th, and acceptance secured September 20th, the unit having remained in service since that time without outage or adjustments. And that is exactly what you can expect when you purchase Riley Boiler equipment. This sort of operation and such dependability are of particular importance when conditions necessitate "single boiler" plant operation to obtain high investment returns.

It is because of results like these that the swing has been and continues to be so definitely towards Riley equipment, and that is why we are justified in saying, "It will pay you to visit modern Riley installations before purchasing Boiler or Fuel Burning Equipment."







COMPLETE STEAM GENERATING UNITS

BOILERS • PULVERIZERS • BURNERS • STOKERS • SUPERHEATERS
AIR HEATERS • ECONOMIZERS • WATER-COOLED FURNACES
STEEL-CLAD INSULATED SETTINGS • FLUE GAS SCRUBBERS

A survey of your power plant by a consulting engineer will possibly show ways of making surprisingly large savings in power costs.

before purchasing Boiler or Fuel Burning Equipment

to supply low-pressure turbines and for the New York Steam Co. All makeup is now introduced to these boilers so that the high-pressure units are supplied only with condensate. New softeners already installed will be able to supply makeup when low-pressure boilers are no longer needed.

Impulse blades were removed from the first turbine shortly after preliminary operation because of failure of similar blades in another turbine. The unit then operated a year and a half without serious difficulty until the coupling between main and feed-heating turbines broke; this required a new rotor. The second turbine, about a year newer, lost capacity due to blade accumulations and was successfully washed with low-pressure steam. Blowing down lower water-wall headers every two weeks while in operation has remedied the blade deposit.

Hot tubes in the top boiler-header sections, minor troubles with gas lighting-off burners and fouling of air-heater surfaces, he added, have either been cured or have been brought to a tolerable operating condition.

Report on Fisk

Only three outages were attributable to the turbine itself at Fisk, according to A E Grunert of Commonwealth Edison Co. Turbine-blade deposits from carryover and sticking valves occasioned early troubles but damage to second moving blade row resulting from the lock washer of a broken cap screw was only found when the unit was taken out for routine inspection.

A number of changes have been made to the boilers, he added, including seal welding of leaky tubes, elimination of the dry pit under the secondary furnace, added circulators, a cooling coil around the slag opening and a steam scrubber.

Logan has operated on a commercial basis since last May, reported Philip Sporn, American Gas & Electric Co, with a heat rate that has met expectations even with restricted amount of circulating water due to the dry season. Hydrogen cooling has been more than adequate with hydrogen pressure at about ½ lb, although the system was designed for 15 lb.

The boiler has caused more outage than the turbine, but the troubles have been overcome and the installation is definitely regarded now as an operating and financial success.

The Omaha unit was overhauled in February, 1938 and is scheduled for inspection in February 1940, said S B Flagg of Ebasco Services. It has been necessary to blast the turbine blades with flyash to remove a hard silica deposit. A starting up procedure has been developed that avoids blowing steam to atmosphere.

F P Fairchild—"New units for Burlington and Marion will follow general designs of Essex installation which has shown availability factors over 90% for the turbine and about 85% for boilers"

G B Warren—"After the birth pains are over, modern turbine types seem to be as reliable as their predecessors"

C B Campbell—"Experimental setup in Schuykill will test blades under actual severe operating conditions to give us a background for future designs"

Slag difficulties have been encountered at loads above 230,000 lb per hr, but otherwise the performance of the large traveling-grate stoker has been free of operation or maintenance difficulties. The Kansas coal being burned has a relatively high sulphur content and low ash-softening temperature—below 2100 F. Slagging of boiler surfaces must be fought continuously and it requires about 14 man hours per day for cleaning of heat-transfer surfaces.

Schuykill has operated for over a year at approximately 80% availability factor, according to C C Baltzly. Failure of a floor tube led to an increase in the slag level maintained and some changes to the baffles were required to get the steam temperature down. Lancing of tubes is still necessary every other day. A carryover situation has now been remedied and minor turbine troubles corrected. Several pump-shaft failures have led to sturdier shaft-construction details. Trouble with cracking down evaporators has led to use of city water and pretreatment of supply by zeolite ahead of the evaporator.

Mr Flagg reported that the Deepwater, Texas, installation had only 1½% outage and the boiler plant only 12% outage in 4½ years.

Springdale and Rivesville

J F Muir, reporting for West Penn's Springdale and Rivesville Stations, thought that the manufacturer's trial-and-error solutions for his turbine problems should be supplanted by exchange of data among manufacturers and a more scientific approach. He said that progress had been made, but that still no date had been set for rebuilding the Springdale turbine. Even so, he admitted, his availability factor was from 82 to 85% for two years.

The Essex turbine has been available 97.5% of the time this year, said F P Fairchild, Public Service Electric & Gas Co of N. J. Since the start of operation, boiler run nine months on oil, seven months on coal and the remainder on oil, depending on the relative costs. Operation to date, he added, has been at 925 F to build up a background of experience before increasing temperature to rated 950 F.

Most of the troubles, he rejoiced, had been caught in their incipient stages and corrected, resulting in an excellent performance record. New installations at Burlington and Marion Stations will follow the same general pattern.

Millers Ford has its second unit under way, said C Spiehler of the Dayton Power & Light Co, with only minor changes based on experience with the 92.7%-available topping unit now in operation.

[The following six pages contain reports on other ASME meetings. For highlights and awards, see page 110.]

Fuel Selection—Coal-Dust Control

TACKLING VITAL PHASES of the fuels problem, industrial-plant and utility engineers gathered for two sessions to discuss factors to be weighed in choosing a fuel, general methods of coal purchasing, control of dust in pulverized-coal milling, and definition of reasonable limits for dust emission.

According to Gosta A Anbro, Colgate-Palmolive-Peet Co, Jersey City, N. J., any analysis of comparative economy of different fuels should include: (1) cost, (2) effect on plant efficiency, (3) effect on steam and power consumption, (4) effect on repair-material costs, (5) effect on labor requirements, (6) refuse disposal, and (7) investment in new equipment. For the New York area, Mr Anbro gave typical dollars and cents values for each of these items, comparing anthracite barley, bituminous coal on stokers and pulverized, and fuel oil. He concluded by applying the data to a plant considering changing from anthracite to oil, and showed how to arrive at the fuel-oil price limit for a large plant equipped to burn either oil or powdered coal.

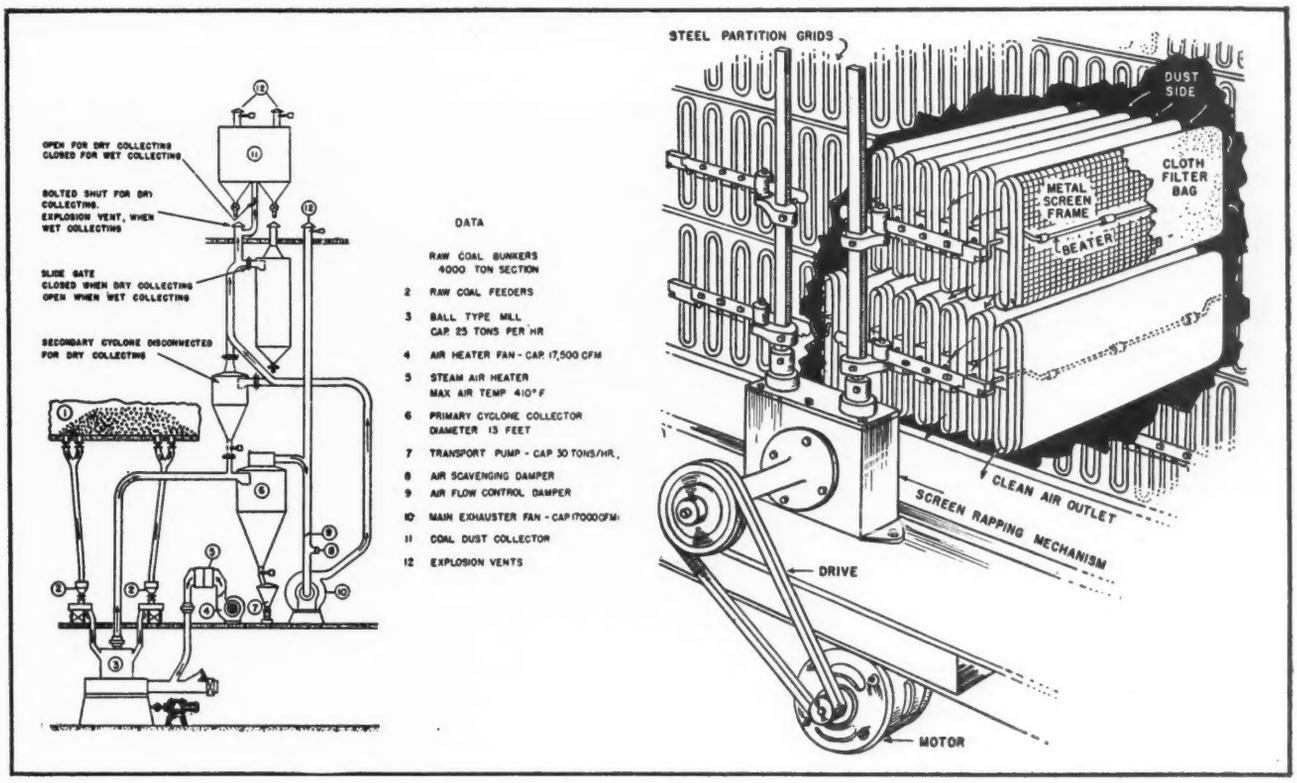
Discussors, representing coal and oil companies, industrial and utility plants, gave further data on relative efficiencies and operating costs, some of which fell within the ranges given in the paper, while others differed. Many stressed the difficulty of generalizing fuel comparisons without regard to varying local conditions, and pointed out the wisdom of designing a plant for as much fuel versatility as can be justified.

Intelligent Coal Buying

R G Rincliffe, Purchasing Agent, Philadelphia Electric Co, outlined a procedure for intelligent coal buying. Where load conditions permit, contract buying works to the advantage of both buyer and seller, as does the employment of competent field engineers to work with the producers to insure preparation of coal of desired characteristics. To complete the picture, the power operator must give the purchasing agent a workable yardstick for evaluating coals. In this connection, Mr Rincliffe displayed a chart used by his company to reduce to a standard base the delivered prices of coals burned successfully.

Installation, operation, and maintenance of cloth filters for cleaning vented air from 25- and 40-ton-per-hr pulverized coal mills at Kips Bay Station of the New York Steam Corp were described by A R Mumford, A A Markson and T Ravese. These filtering units replace cyclones and dust washers, permitting reclamation of dry dust. Lacking data, the authors investigated the pressure-drop characteristics of filter cloth, checking the effect of flameproofing and the effect of coal-dust loading. They also studied the precautions necessary to insure safe operation. The paper presented detailed data on these various factors and notes on inspection and maintenance.

P H Hardie, Consolidated Edison Co of N. Y., outlined factors to be considered in setting a stack-emission limit: (1) location of plant, (2) size of particles, (3) blackness of particles, (4) height of stack, (5) ash content of coal in normal use in a given area, and (6) collector efficiency under test and operating conditions. Many of today's tentative limits are based on amount of dust per unit volume of gas; Mr. Hardie suggested that basing the limit on dust per unit weight of fuel burned would avoid penalizing the efficient plant operating with low excess air and, consequently, low gas volume per lb of fuel burned. He also indicated the wisdom of basing the limit on 24-hr averages rather than maximum dust emission.


OPEN FOR DRY COLLECTING
CLOSED FOR WET COLLECTING
BOLTED SHUT FOR DRY COLLECTING.
EXPLOSION VENT, WHEN WET COLLECTING
SLIDE GATE
CLOSED WHEN DRY COLLECTING
OPEN WHEN WET COLLECTING
SECONDARY CYCLONE DISCONNECTED FOR DRY COLLECTING
DATA
1 RAW COAL BUNKERS 4000 TON SECTION
2 RAW COAL FEEDERS
3 BALL TYPE MILL CAP 25 TONS PER HR
4 AIR HEATER FAN - CAP 17,500 CFM
5 STEAM AIR HEATER MAX AIR TEMP 410° F
6 PRIMARY CYCLONE COLLECTOR DIAMETER 13 FEET
7 TRANSPORT PUMP - CAP 30 TONS/HR.
8 AIR SCAVENGING DAMPER
9 AIR FLOW CONTROL DAMPER
10 MAIN EXHAUSTER FAN - CAP 170000 CFM
11 COAL DUST COLLECTOR
12 EXPLOSION VENTS
STEEL PARTITION GRIDS
DUST SIDE
CLOTH FILTER BAG
METAL SCREEN FRAME
BEATER
CLEAN AIR OUTLET
SCREEN RAPPING MECHANISM
DRIVE
MOTOR

Working on this coal and air-flow circuit, cloth filters with shaking mechanism clean coal-dust from vented air of a 25-ton-per-hr pulverizing mill

Operating and Designing Engineers Get Together on Governor Performance

AT THREE SESSIONS on prime-mover-speed and power-system regulation, both steam-turbine and hydroelectric-unit governor performance was analyzed. Studies showed that poor regulation can cost a lot of money in reduced power-plant efficiency, low capacity of tie-lines, and decreased system stability.

Supersensitive Governor

William M White described a motor-driven governor for hydraulic turbines sensitive to speed changes as small as 0.02%. Flyballs of the governor are supported on multiple flat steel springs, thus eliminating all moving joints and friction. A pilot valve rotated and actuated by the governor head is arranged so that it is also practically frictionless.

High sensitivity is obtained by driving the flyballs at the high speed of 900 rpm. At this speed, flyball power is enough to move the pilot valve at the slightest change in speed. Aside from the supersensitive flyballs, a multiplying device and means for causing speed droop, remaining parts of the governor, are the same as on usual units.

The restoring mechanism has been made unusually rigid to permit proper division of load between units on a speed droop of about 0.5%. Because of high sensitivity, the speed droop may be set as low as 0.1% with fair division of load between units.

Mr White said that a separate generator, driven by the governed unit, to supply the flyballs-driving motor is the best known means of maintaining a fixed speed ratio between the flyballs and turbine shaft. Transformers connected to the system for supplying power to the same motor is the best known method of providing a fixed ratio between flyball speed and system cycles. A high degree of regulation has been attained by both of these methods.

Power swings chargeable to hydraulic turbines have been found in hydro plants built as far back as 1912. However, it has only been in the last 10 years that much thought has been given to such swings, their characteristics, source and elimination. W J Rheingans showed that these swings are caused by draft-tube surges always accompanied by penstock fluctuations of similar frequency, Fig. 1.

On a 250-kw, 60-cycle hydroelectric unit, fins were installed in the draft tube, see Fig. 2. These fins reduced the power swing and system-frequency fluctuations by 75%, Figs. 3 and 4. Draft-tube surges, penstock-pressure fluctuations and penstock vibrations occurring on two 1700-kw units, as shown on the left of Fig. 1, were practically eliminated by admitting air to the draft tubes, see right, Fig. 1. Interesting was the fact that, in spite of the magnitude of draft-tube vacuum surges and penstock-pressure fluctuations, there were no power swings. This was because frequency of the draft-tube surges was considerably higher than the natural frequency of the generator connected to the transmission system.

In an inter-connected power system, frequency regulations and tie-line power swings are influenced by electrical characteristics of all electric equipment connected to the system, including generators, lines and miscellaneous motors, as well as by the mechanical characteristics of all rotating apparatus. In his paper "Generator Characteristics as Affecting System Operation." Sherwin H Wright visualized the inter-related action of these factors. Using a mechanical analogy developed in connection with power-system stability studies, he discussed angular displacement with load and kinetic-energy values of typical machines, generator reactance and short-circuit ratio.

Reed J Caughey expressed the opinion that steam-turbine governor importance at present rises more from increased complexity of inter-connection requirements than from any definite deficiency in existing apparatus. Satisfactory operation of a steam-turbine-governing mechanism depends upon the sensitivity and response of this mechanism. To develop the effect of these relations, Mr Caughey discussed (1) general principles of governing; (2) governors and their limitations as speed indicators; (3) govern-

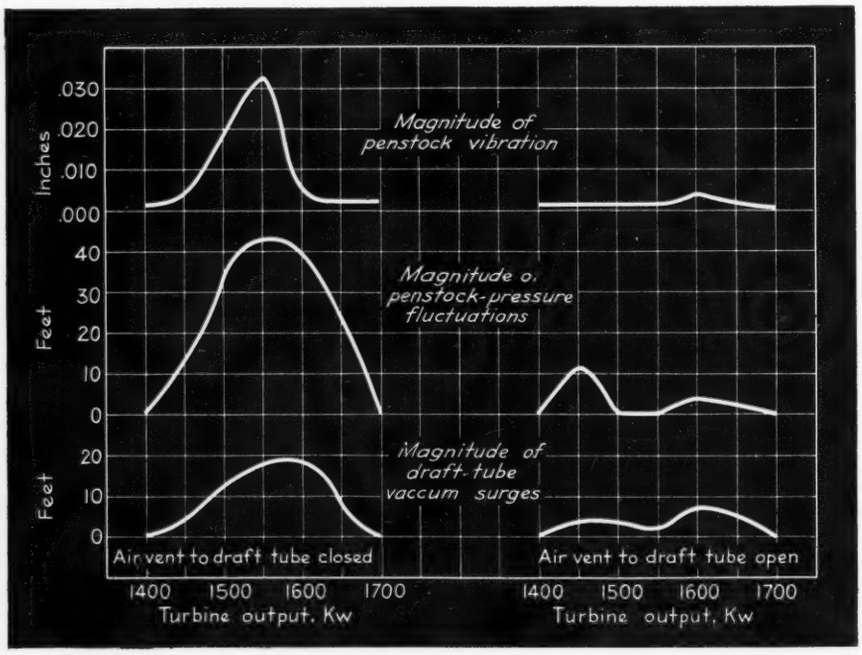


Fig. 1—Relation between draft-tube surges, penstock fluctuations and penstock vibrations when draft-tube vent is closed and also when it is opened

ing mechanisms and their limitations due to regulation and rapidity of load changes; (4) protection of the steam turbine against over-speed, including governing problems encountered in the design of superposed steam turbines with a tentative specification for steam-turbine governing mechanisms.

A F Schwendner discussed the effect governors and governing valves have in maintaining or disturbing the system speed. He emphasized the need of systematic study of governor performance by saying that it does not help a power system when the manufacturers supply generating units with governors capable of the widest changes in control characteristics, and no attempt is made to use them. A survey should be made of the existing governor performance in each power plant on an inter-connected system, and existing governor performance corrected to suit system needs as much as possible with existing equipment. When ordering new units, analyze the required governor performance with all practical combinations of units, power plants and loads, just as carefully as the best combination of steam conditions is determined. The required governor performance should then be specified, including possible changes in characteristics, while the unit is in operation and shut down.

Mr Schwendner recommended that a committee define standards in performance and set up methods of checking and testing governor performance. The range of the variable characteristics should be determined; also, which one should be susceptible of change with the unit in operation. A definite governor-performance specification will help the turbine builders, and a knowledge of the limitations of each governor will help the system operator.

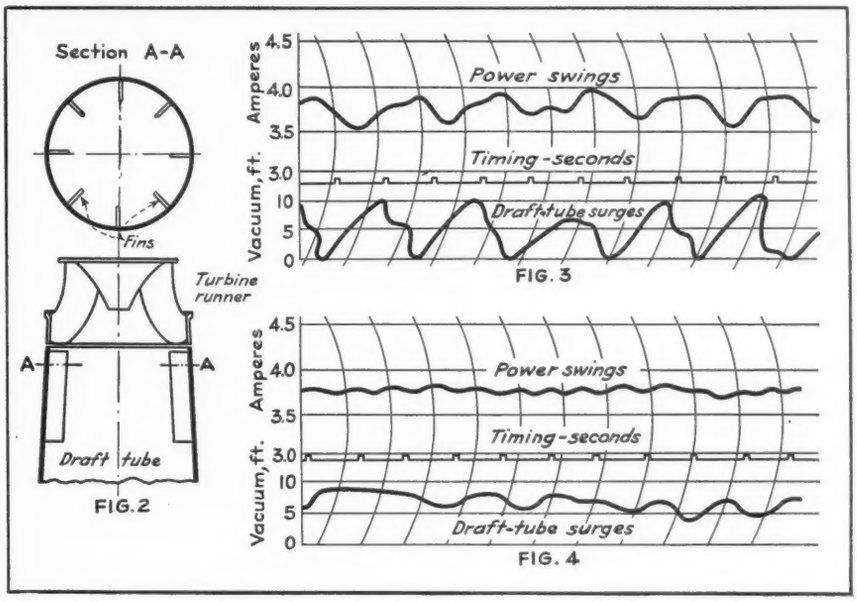


Fig. 2—Fins in draft tube reduce surges and power swings. Fig. 3—Record of power swings before and, Fig. 4, record of power swings after installing fins in draft tube, Fig. 2

Philadelphia Practice

Herbert Estrada and H A Dryar discussed the practices of the Philadelphia Electric Co in regulating system load and frequency, including the scheduling and actual operation of generating capacity with regard to reliability and economy. Their conclusions were:

(1) Sensitivity of governors should be increased as much as possible to give them smoother operation and provide a definite relation between change in frequency and change in system load for small changes in load or generation.

Instantaneous speed regulation of governors over the entire load range should be more uniform to improve governor stability where instantaneous regulation is lower and to limit speed variation for a given change in load where regulation is high. Instantaneous regulation, however, should be higher in percentage where sharp increases occur in turbine incremental heat rate and at minimum loads on a station where boiler-plant conditions may become unstable with extreme load changes.

(3) Average speed regulation of governors should be reduced as much as possible without sacrificing stability of parallel operation. This should be applied generally throughout the systems of an interconnected group to limit the burden due to load variation on any particular station.

(4) Where tie-line loads must be regulated, frequency of regulation or tie-loading is a mutual operation, requiring cooperation of all system dispatchers. Frequency regulation must be done with tie-line loading in mind and tie-line-loading regulation performed with regard to the frequency.

(5) Where inter-connection tie-lines require no regulation, frequency variations will indicate a change in system load, and inter-connection dispatchers can allocate load change on the basis of economical loading.

Otto Holden presented illustrations of normal operating experience with speed regulation on several systems of the Hydro-Electric Commission of Ontario, in which results vary greatly. The systems range from one generating station supplying two customers to a load of approximately 1,400,000 hp supplied by eight or more generating stations with upwards of 1500 miles of 110- to 220-kv transmission lines. Three plants at Niagara Falls, with a combined capacity of 830,000 hp in 36 units, varying from 11,700 to 58,000 hp, supply the major part of the power to the Niagara system, peak load of which was about 1,400,000 hp in 1938.

This system is of such size that variations in individual loads are scarcely of any moment. Even sudden loss of one large generating unit is scarcely noticeable throughout the system. The enormous amount of kinetic energy in the remaining units prevents any material change in speed during the few seconds other units increase their output to compensate for the capacity lost in the unit that dropped out of service. The problem in this case is one of sensitivity and accurate governing to maintain at all times the normal frequency of the system.

Albion Davis, in a paper "The Field of System Governing," presented a comprehensive study on governors and their place in a power system. Mr Davis emphasized the economic side of the problem by saying that over and above the matter of rendering good service, steady and close regulation of frequency will pay a nice return in dollars. In the case of steam units, load swings of any magnitude are accompanied by adjustment of boiler controls to meet the new conditions. While boilers go from one stable condition to another, a loss of efficiency results. Losses may be of equal magnitude in a hydro plant due to excessive regulation.

Governors perform one of the most responsible tasks on a system and often they get the least attention, but few

real studies have been made of their performance as system units, said Mr Davis. As long as a governor does not hunt too badly when synchronizing, does not overspeed too much when its load is thrown off, and as long as it is not too active in normal operation, it is left alone. Each governor, however, is an individual. Just as individuals need to be organized for a common task, so do governors need coordinating for their task of system governing.

To present in more tangible form some of the requirements which might lead to better governing on power systems, Mr. Davis proposed the following six items as some of the essentials to include in the specification for performance of new governors on important system prime movers:

(1) A sensitivity of 0.01%. On a speed change as small as 0.006 cycle on a 60-cycle system, the governor will pass oil into the operating cylinder to produce a corrective movement of the control valves or gates.

(2) Assuming that, over the normal operating range the kilowatt output of the unit varies approximately in direct proportion to the movement of the operating-cylinder piston, then the travel of the piston per unit of speed change should be made the same over the full range from zero to full opening, regardless of the initial load setting of the turbine.

(3) Operating-cylinder-piston travel per unit of instantaneous speed change on the speed droop of the governor should be made accurately by hand without the aid of tools while the unit is running. There should be an accurate dial indication of this adjustment. This speed droop of the governor should be made adjustable from zero to 10% of operating-cylinder-piston full travel, speed droop being defined as the change in speed in % of normal required for the governor to move the operating cylinder piston from closed to full position.

(4) The governor should be capable of stable operation, either alone or in parallel with other units, when set on a speed droop of 0.5 to 1%.

(5) The governor should have a load-limiting device adjustable by hand without tools while the unit is running. There should be a dial indication of load and load limit on one scale calibrated in tenths and hundredths of full travel of the operating piston.

(6) The governor should be equipped so that the unit may be synchronized from the switchboard room at any system speed from 5% above to 20% below normal speed, or from 63 to 48 cycles on a 60-cycle system.

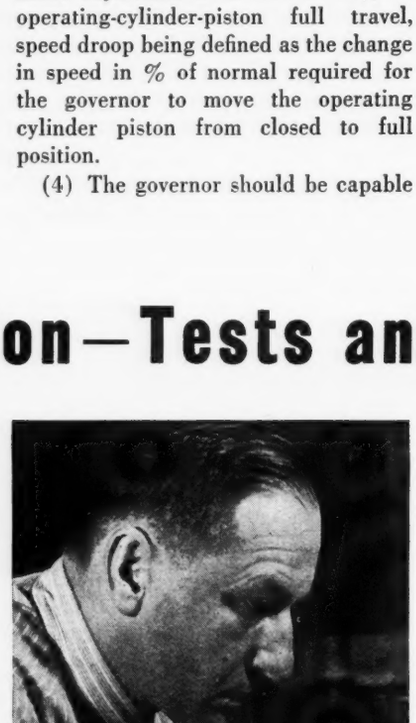
Mr Davis called attention to the fact that poor performance of governors may be due entirely to lack of intelligent maintenance, rather than from poor design. The best governor this year may be the poorest one five years later if it becomes worn. Keeping governors up to a system standard of mechanical performance is essential to good governing.

Lubrication—Tests and Results

AIMED AT FINDING OUT what goes on in bearings of various designs, four papers on lubrication were presented at the annual meeting. The first of these, "Influence of Crystal Size on the Wear Properties of High-Lead Bearing Metal," by John R Connelly, indicated that for the bearing metals investigated, crystalline structure is a factor and crystal size an important variable in thin-film lubrication. Other things being equal, a very small crystal size gives lowest rate of wear.

In corroboration of the results, Mr Connelly pointed out that the motor-car industry produces bearings having crystal dimensions of the order of 0.001 in. Bearings that are poured in place, such as large pillar block designs, have large crystals and should be so designed that the inserts can be cooled rapidly after pouring.

Plastic-material bearings can be used successfully, not only with perfect-fluid lubrication, but also with semi-fluid lubrication, according to L M Tichvinsky. Certain additions, such as graphite, will some times permit use of these materials under conditions of drive friction. Because of their good physical properties, bearings made of plastic materials, such as Micarta, find wide application. Heavy-duty bearings of this kind are used in steel mills;



L M Tichvinsky at work in his lab

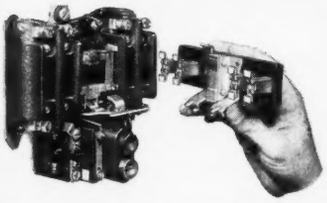
lubricated and cooled with water, they carry heavy loads at pressures of several thousand lb per sq in. As guide bearings, their performance ranges from small high-speed spindles to large ship propeller shafts.

All bearing surfaces must be well run-in before the most favorable operating conditions are obtained. This is especially true with plastic-material bearings where running-in must be done carefully and skilfully, by loading the bearing gradually at low speeds until full load is reached, and then bringing it by steps, to full speed.

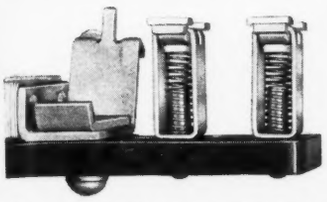
Sidney J Needs described attempts made in Dr Kingbury's laboratory to detect the influence of boundary surfaces on the viscosity of thin lubricant films between two optically plain parallel disks. Investigation included both mineral and vegetable oils. Results of the test indicate that when two optically smooth plain-steel surfaces are brought together in the presence of oil, in such manner that formation of a parallel film is possible, the distance between the surfaces will reach some definite minimum value, depending upon the viscosity of the oil and the external force acting upon the surfaces. At room temperature, with surfaces $\frac{7}{8}$ in. in diameter, the minimum film thickness varies from about 30 millionths of an inch with olive oil to about 60 millionths of an inch with a heavy cylinder oil.

E S Pearce presented results of an investigation on heat distribution in a conventional journal-box bearing, in which condition of the waste, oil and bearing was thoroughly tested.

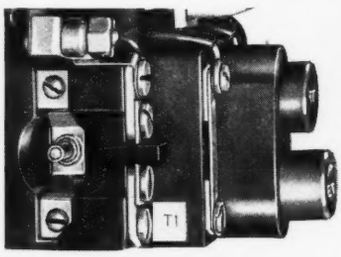
Some of the outstanding features of the New C-H NEMA Size 1 Starter



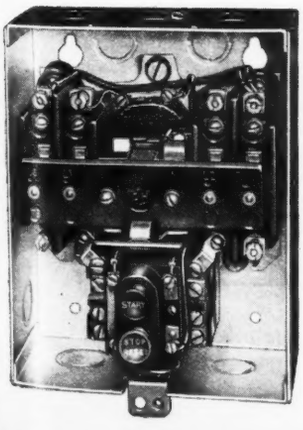
Vertical Dust-Safe Contacts Dust can't settle on vertical contacts. Vertical contacts mean better motor control. C-H vertical, dust-safe contacts are out in the open, cool, accessible, *safe*.



The pure "fine" silver contacts have been made much heavier, to establish new records for trouble-free performance under the most severe service. Lava insulators protect contact springs against even minor heat transmission, thus insuring full contact pressure at all times . . . an instantly accepted feature of good engineering which greatly extends the life of these working parts. Both contact springs and contact supports are now made of stainless steel . . . a feature widely accepted, but appreciated most where corrosive atmosphere is a problem.



The famed C-H "Drop of Solder" overload relay has been further refined. New *enclosed* heater coil construction . . . and new solder-alloy assembly easily and quickly removed for inspection. When an overload occurs, you don't have to guess why the motor has stopped. The red button pops forward, telling you at once. Overload relay is free-tripping.



The use of new Densheath internal wiring makes the Size 1 Starter exceptionally workmanlike in appearance. From the handsome cover, streamlined and simplified in the best modern design, to the beautifully finished light interior, advanced design is used throughout. Case has solid back. Mechanism is rubber mounted on a dead-back panel.

And now Cutler-Hammer Announces

A New Size 1 Starter

for motors up to 5 h. p.

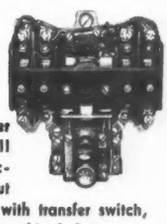
A great switch principle has been improved, and a great new Size 1 Starter has been brought out by Cutler-Hammer for the control and protection of single phase motors and polyphase squirrel cage motors up to 5 h.p.

The basic design of this new starter is the design that has been pronounced repeatedly an outstanding example of masterful engineering. It has proven its correctness during 10 years of sales leadership . . . 10 years during which time it has withstood, successfully, repeated redesigns, by others, in an effort to meet C-H- standards.

In this new Size 1 Starter, the *proven* C-H design has not been changed . . . simply *refined* . . . and *improved* . . . to set still higher standards of performance. Seasoned and practical men recognize the worth of these refinements at once. Make sure you see this new starter immediately. Cutler-Hammer Representatives will be glad to demonstrate its advantages to you. CUTLER-HAMMER, Inc., *Pioneer Electrical Manufacturers*, 1358 St. Paul Ave., Milwaukee, Wis.

CUTLER·HAMMER
MOTOR CONTROL
C-H

Price, $16.00 for the New 9586 NEMA SIZE 1 Cutler-Hammer Starter



The new C-H Starter is available in all standard constructions, with or without pushbuttons in case, with transfer switch, in combination starter, and in skeleton construction for built-in application.

Turbines, Blades, Steam

RESEARCH IN BLADE EFFICIENCIES, nozzle characteristics, stresses in turbine buckets and roots, stresses in generator rotors and further extension of reported knowledge on viscosity and enthalpy of steam captured attention of individual groups most interested in these highly specialized branches of engineering.

Mapping blade contours by compressed air to determine where losses occur was described by W R New of Westinghouse. By moving tiny hypodermic-needle pitot tubes along blade and nozzle streams, the author explained, impact pressure of the stream flow can be plotted, from which performance of the blade at various flows can be determined. The idea is not new, he said, but the care and accuracy with which new apparatus is used has already developed much valuable information on the effect of changing the impact angle of steam on the blade.

New Nozzle Tester

In a companion paper, H Kraft and T M Barry of the General Electric Co described a new automatic recorder and integrator now in use in the air-test laboratory at Lynn, Mass. Photoelectric cells, light-interrupting disk counters with small holes to utilize frictionless light beams, ratchet mechanisms, and recording apparatus complete investigation of a model nozzle block in a fraction of the time previously required, making possible an immense increase in the number of investigations which can be undertaken. Compressed air, it was stated, plays the same part in the work of blade design as does the X-ray in the field of medical diagnosis.

In discussion, Professor Yellott of Stevens Institute noted that air tests are conducted with easily shaped and conveniently modified wooden blades; the final result can readily be interpreted in steel. Of course, added J S Smith of the Elliott Co, air-test conditions do not exactly simulate actual turbines and the differences have to be taken into account as best possible by the designer. Mr. Kraft, replying for the authors, expressed acute consciousness of the limitations of air-test data, but he explained that many of the conditions shown up by air tests had been checked in finished machines with steam under actual operating conditions and found to agree closely.

Crude early air tests in 1919, added G B Warren of General Electric, showed holes in the stream flow by merely passing the fingers over the exit edges. Without adequate apparatus, serious defects in what were then standard blade shapes were found and resulted, in some cases, in turbine-efficiency improvement of 10%. Of course, he explained, no such improvement is possible with the blades in use today, as most blades are already over 90% of theoretical perfection.

Professor J H Weske of the Case School of Applied Science suggested that one of the problems was to aid in visualizing what happened to eddies and showed some interesting motion pictures of sawdust-on-water eddies. These, he explained, were qualitative only but aided students and others in following explanations of the actual conditions.

Application of polarized light to the analysis of stresses in blade roots was the subject of a paper by Professor J J Ryan of the University of Minnesota and Dr J T Rettaliata of Allis-Chalmers. Bakelite blade models showing fringe patterns of stress concentration are particularly useful, it was explained, in studying multiple-step roots.

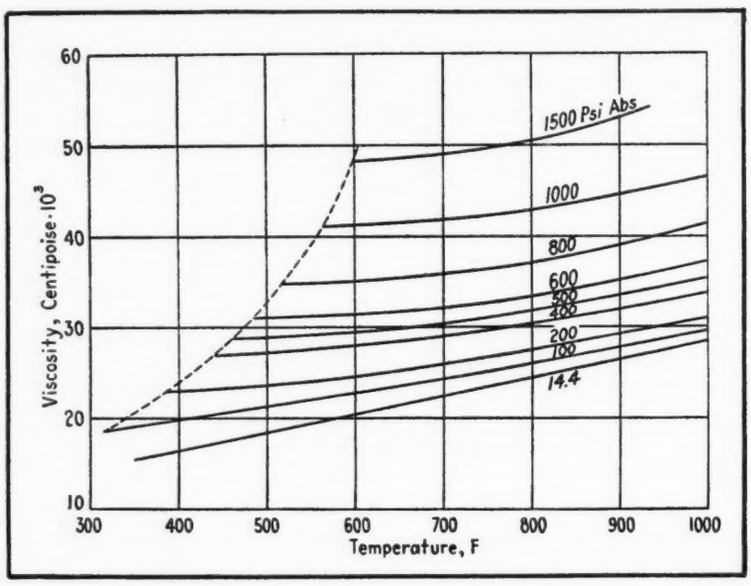
Similar photoelastic patterns for generator-rotor teeth were shown by M Hetényi, Westinghouse Co. Modern 2-pole high-speed generators are not slotted uniformly around their periphery and the unequal stiffness results in vibration unless some metal is cut away to reduce the rigidity of the stiffer plane. Freezing the stresses in bakelite models, he explained, offered a check on the calculations.

A paper on the calculation of blade performance based on dimensional analysis was submitted by Adolf Egli of Sulzer Bros, Switzerland. The method applied particularly to mixed-pressure and extraction turbines where steam flows vary over a wide range.

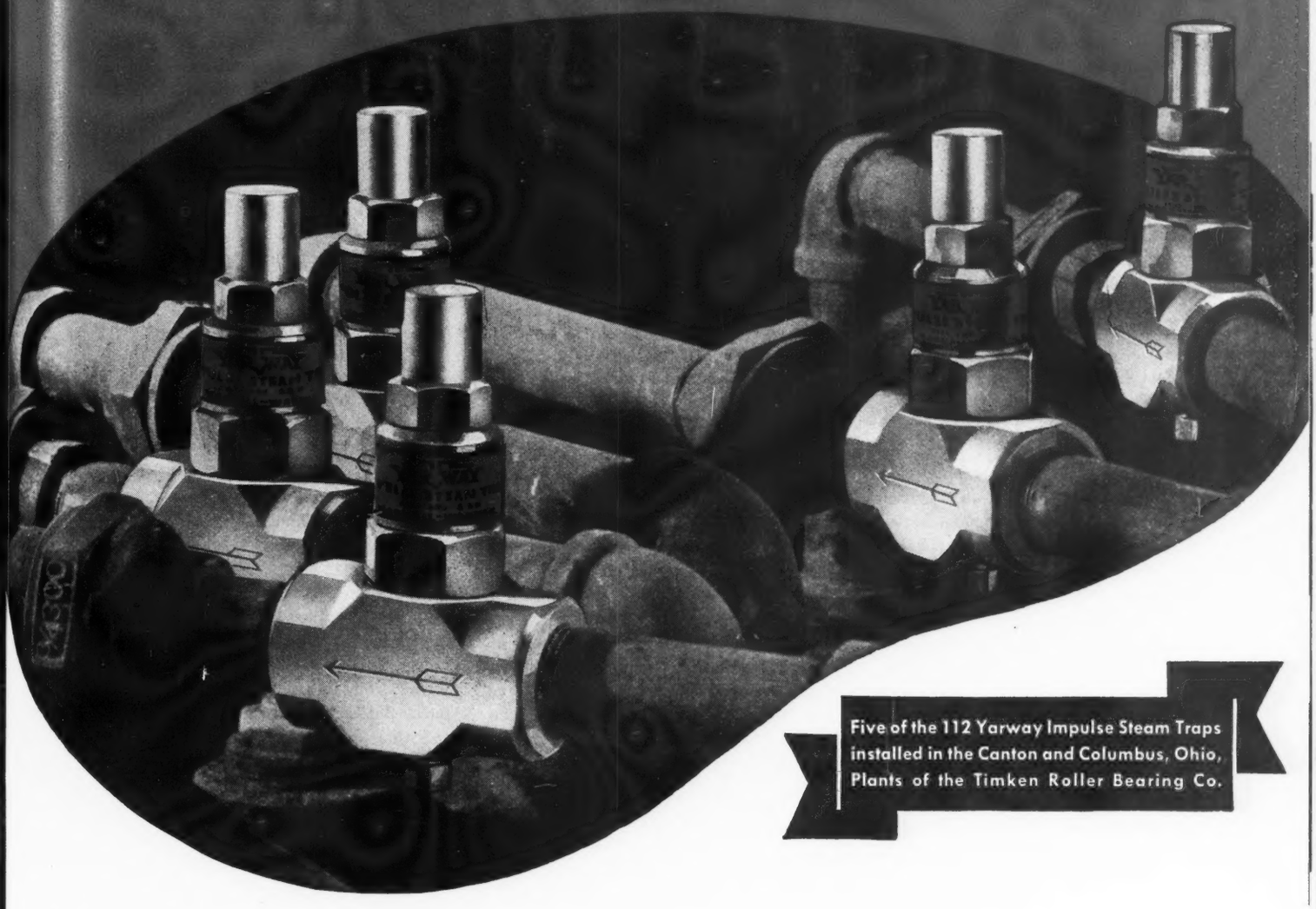
Two papers added further data on the properties of steam. Professors Hawkins, Solberg and Potter of Purdue presented the results of a study of superheated-steam viscosity. Latest curves are shown below. In general, the results check previous data presented by the same authors in 1935, but were obtained with entirely different apparatus and by a different method.

A brief report of investigations of the change in enthalpy of steam with pressure at low temperatures was presented by Professor F G Keyes, based on research work now under way at Massachusetts Institute of Technology.

Purdue viscosity curves for superheated steam



TIMKEN *uses* 112 YARWAY IMPULSE TRAPS



Five of the 112 Yarway Impulse Steam Traps installed in the Canton and Columbus, Ohio, Plants of the Timken Roller Bearing Co.

THE world rolls on Timken Bearings. And Yarway Impulse Steam Traps are proud to have a hand in their manufacture —by providing more efficient operation of steam equipment in Timken's Canton and Columbus, Ohio, plants.

More than 50,000 Yarways have been installed

The list of Yarway-equipped plants reads like a "Who's Who" of American Industry. Yarway Trap performance talks. Quicker heating and greater sustained heating efficiency soon pay for the installation and continue to return worthwhile profits in plant operating economy. When you consider that their purchase price is usually no more than the cost of repairing an ordinary trap — why not get Yarway performance for your money?

Install a Yarway Impulse Trap or two and let them demonstrate what they can do for you in speeding production and saving fuel.

See how its small size saves space. How its light weight simplifies installation. How its unique design with only one moving part, and its rugged bar-stock construction, keep down maintenance expense. Then too, Yarway Traps are *suitable for wide range of pressures without change of valve or seat.*

A nearby Mill Supply Dealer handles Yarway Impulse Traps and will be glad to serve you. Or write for Catalog T-1734.

YARNALL-WARING COMPANY
100 Mermaid Ave. • Philadelphia, Pa.

YARWAY IMPULSE STEAM TRAP

Boilers, Piping, Heat Transfer

DESCRIBING A NEW METHOD of comparing boiler performance, E G Bailey, Babcock & Wilcox Co, told of historic tests made on a small locomotive boiler by the Northern Railway of France, 1860-64. The water and steam side of the boiler was divided into five sections so that evaporation from each could be measured and the rate of heat absorption in each part of the boiler could be determined. The chart below (left) shows results of this test plotted as per cent of available heat absorbed against heating surface.

Mr Bailey pointed out that modern methods of temperature and gas-flow measurement make it possible to study distribution of heat absorption by taking furnace-gas temperatures and weights at consecutive stages in the gas travel, the difference in heat content between any two points being the heat absorbed by radiation and convection by any surface between the points. To make data from such tests useful, plotting per cent heat absorbed against actual heating surface was abandoned. Use of "equivalent area" makes curves for different loads on the same boiler, and for different boilers, comparable. To get equivalent surface area, an arbitrary figure, 500,000,000 Btu available per hour, is divided by the actual total Btu available for absorption, and multiplied by the actual area in sq ft of all cumulative surface under consideration. The right side of the chart below shows the results of plotting the same data in this different way.

Using test data available on small and medium-size stationary boilers and on comparable marine and locomotive boilers, Mr Bailey applied his method of analysis and made some interesting deductions. In conclusion he stressed the importance of heat absorbed and equivalent surface as basic factors for comparison of boiler performance.

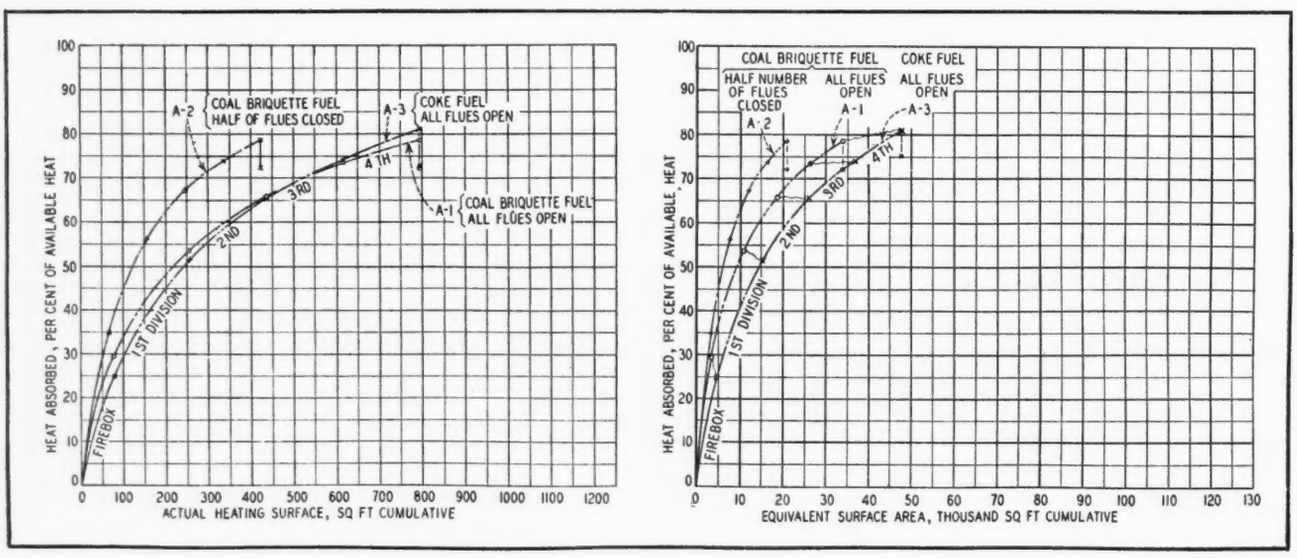
Locomotive Boilers

In another paper presented at the same session, C A Brandt, The Superheater Co, discussed problems of locomotive-boiler design, covering factors such as formulas for boiler capacity; relation between gas area and boiler efficiency and capacity; relation between firebox volume and combustion efficiency; absorption efficiency of heating surfaces; relation between grate area, efficiency and capacity; secondary air for combustion; front-end design and draft; superheaters; and feedwater heating. Mr Brandt included numerous performance charts and comprehensive design data on present-day locomotives, much of which should prove interesting to stationary-boiler designers.

D B Rossheim and A R C Markl, M W Kellogg Co, presented a paper intended as a vehicle for discussion leading to agreement on working stress limits for pipelines. Basic problems covered included (1) proper allowable stresses for combined pressure and expansion effects, (2) influence of and limits for localized stresses under static and repeated loading, (3) capacity of bolted joints to withstand expansion effects without leakage or damage to flanges, bolts or gaskets, (4) effect of pre-springing, self-springing, creep and yielding on operating and off-stream stresses.

In a session devoted to heat-transfer, new data for transfer from a condensing vapor to water flowing downward in vertical tubes (as in a shell-and-tube ammonia condenser) were presented by W H McAdams, M I T, T B Drew, E I du Pont de Nemours Co, and G S Bays Jr, Humble Oil and Refining Co. Reviewing previously published analytical results for transfer for laminar flow in ducts, R H Norris, and D D Streid, General Electric Co, extended the same analysis to flat ducts with constant surface temperature and parabolic velocity distribution and to round and flat ducts with constant heat input per unit of length.

Accepting the usual assumptions made in deriving logarithmic mean temperature difference, E A Schumann Jr, Detroit Edison Co, developed methods for calculation of fluid temperature changes in single- and 2-pass, cross-flow heat exchangers. He included in his paper curves and a table of "surface effectiveness factors", to facilitate computations. A paper by W Nagle, and A C Mueller, E I du Pont de Nemours Co, and R A Bowman, Westinghouse, gathered results of previous writers on mean temperature difference, putting them on the same basis to give as complete a picture as possible of various arrangements of surface and flow.


HEAT ABSORBED, PER CENT OF AVAILABLE HEAT
ACTUAL HEATING SURFACE, SQ FT CUMULATIVE
A-2 COAL BRIQUETTE FUEL HALF OF FLUES CLOSED
A-3 COKE FUEL ALL FLUES OPEN
A-1 COAL BRIQUETTE FUEL ALL FLUES OPEN
FIREBOX
1ST DIVISION
2ND
3RD
4TH
EQUIVALENT SURFACE AREA, THOUSAND SQ FT CUMULATIVE
COAL BRIQUETTE FUEL HALF NUMBER OF FLUES CLOSED
COAL BRIQUETTE FUEL ALL FLUES OPEN
COKE FUEL ALL FLUES OPEN

Two ways of showing distribution of heat absorption in a boiler; chart on right shows improved method based on "equivalent surface area"

Edward alloy steel 6 in. 900 lb globe stop valves. Often built with welding ends. Edward Impactor handwheels amazingly augment man power when opening or closing

GUARDED...

by Edward Stop Valves

Edward straightway forged steel globe valves, better year by year, deserve a place in every plant. Order Fig. 2688 (above) and other out-of-stock Edward valves from Better Valves Catalog No. 101. Ask for copy.

• • •

THE EDWARD VALVE & MFG. CO., INC.
EAST CHICAGO INDIANA

IF you want to stop flow in a pipe, no valve equals a globe — or angle – stop valve in efficacy. It can cope with high temperatures and high pressures. It is first choice for throttling. And if leaks should develop – due to stray foreign matter, abuse, erosion, corrosion, improper service or old age – repairs may be made more cheaply and quickly than with other types of valves.

Built into Edward globe and angle stop valves are the results of three decades of intensive study of such vexing problems as are related to non-return, blow-off, and boiler feedline stop-check valves in which Edward has always specialized. Internal contours promote free flow without undue turbulence and cross currents. Carefully selected, painstakingly tested, and accurately machined materials prolong life. Keen inspection is maintained to catch mistakes. Design details are frequently revised to keep pace with new developments. Disks are positively guided by integral body ribs, self scouring, non-clogging, and assuring accurate seating.

For ease of operation, the Edward Impactor handwheels shown on the 6 in. 900 lb valves (above), or the super size knobbed handwheels on the forged steel valve (left) make friends with operators, save time and money, and improve plant appearance.

EDWARD VALVES

BOOKLETS • CATALOGS • BULLETINS NEW

For Your Convenience—Copies of the literature described on this and following pages may be obtained by filling out the business-reply cards on page 119.

Almost 400 items have been described, covering practically all equipment and supplies used by power engineers. So don't get worried if your requests fail to come back to you by return mail, because it will take two or three weeks at least to sort and classify the return cards. We have made our New Year's resolution in advance to get literature to you as quickly as possible.

AIR-CONDITIONING EQUIPMENT

1 AIR CONDITIONING—Carrier Corp, Syracuse, N. Y. 12-page 1939-40 condensed catalog of air conditioning, heating and refrigeration equipment includes every type of Carrier equipment from room ventilator to centrifugal refrigeration machines, including units for homes, business houses and industrial plants.

2 CONDENSING UNITS—Carrier Corp, Syracuse, N. Y. 4-page leaflet describes Carrier "Conditioned Cold" condensing unit, built in ½- and ¾-hp sizes, air cooled.

3 AIR CONDITIONING — Carbondale Div, Worthington Pump & Machinery Corp, Harrison, N. J. 12-page bulletin No. C-1150-B2 describes installations in theatres in New York, South America, Honolulu, and various parts of the United States.

4 AIR CONDITIONING—United States Air Conditioning Corp, Graybar Bldg, New York, N. Y. 12-page booklet covers "Refrig-O-Miser," refrigeration economizer, for use in winter and summer, utilizing new principle for saving power costs. Complete system described.

5 AIR CONDITIONING AND REFRIGERATION—Frick Co, Waynesboro, Pa. 17-page bulletin No. 670 describes air-conditioning installations in several of the large cities in the New England States and New York City.

6 AIR-CONDITIONING EQUIPMENT —Carrier Corp, Syracuse, N. Y. 16-page booklet No. CE114 presents air-conditioning equipment for stores, homes, and offices, together with refrigeration and heating equipment. Products are described according to application; function, advantage, and size.

7 AIR-CONDITIONING UNITS — Worthington Pump & Machinery Co, Harrison, N. J. 6-page folder C-1100-B3, covers Carbondale Div air-conditioning units, with typical installation arrangements. Air-conditioning cycle described for all seasons, giving operation of unit at different parts of year.

8 AIR CONDITIONERS — Frick Co, Waynesboro, Pa. 24-page booklet presents air conditioning and refrigeration in Baltimore and the South by Paul J Vincent Co.

9 AIR CONDITIONING — Air Conditioning Mfrs Assn, Southern Bldg, Washington, D. C. 12-page booklet, "Story of Air Conditioning" is illustrated in Walt Disney style, introducing characters "Tempy", "Drippy", "Dusty", and "Stirry", as temperature, humidity, cleanliness, and air motion. Sketches of characters and description of treatment in air conditioning comprise booklet.

10 DEHYDRATOR — Carrier Corp, Syracuse, N. Y. 10-page bulletin 53B-1 describes operation of Silica Gel dehydrator in controlling humidity independent of temperature. Both industrial and domestic uses pictured.

10-A HUMIDIFYING SYSTEMS — Spray Engrg Co, 114 Central St, Somerville, Mass. 5-page booklet, "We Improved Upon the Camel", describes typical instances of "industrial desert" and how spraying systems can be used to offset its effect.

AIR FILTERS

11 AIR FILTERS — Air-Maze Corp, 5200 Harvard Ave, Cleveland, Ohio. 22-page catalog shows construction features of Air-Maze industrial filters, industrial-automotive filters, and other types of filters. Shows typical models.

BEARINGS

12 BALL BEARINGS—Stephens-Adamson Mfg Co, Aurora, Ill. 8-page catalog No. 739 describes "Sealmaster" prelubricated, self-aligning ball bearings, pillow blocks, and take-up units, giving dimensions, load capacities, and applications.

13 BEARINGS—Timken Roller Bearing Co, Canton, Ohio. 8-page booklet presents Timken bearings installations at the New York World's Fair. Picture of Timken exhibit at Fair, and various locomotives at Railroads exhibit.

14 BEARINGS—Timken Roller Bearing Co, Canton, Ohio. Double-page descriptive folder tells story of roller bearings from the first installation in horseless carriage to modern application in Pennsylvania R R streamliner. Tells where they are, what they replace and why, their experience, and general discussion.

15 BEARINGS—Johnson Bronze Co, 310 South Mill St, New Castle, Pa. Catalogue L-1, 8-pages, announces that bronze bearings and bushing formerly manufactured to order, will be available in stock sizes. Over 300 sizes to be manufactured in large quantities and distributed to supply houses.

16 BEARINGS—The Fafnir Bearing Co, New Britain, Conn. "Ball Bearings for Power Transmission Units"—40-page booklet tells story of development of Fafnir Wide Inner Ring bearing.

17 BEARINGS—Johnson Bronze Co, New Castle, Pa. Catalog 370 lists general-purpose bearings, bronze bars, and complete line. Separate supplement contains price list of bearings.

18 BEARINGS—Johnson Bronze Co, New Castle, Pa. 72-page catalog 390 incorporates information on bronze-bearing service. Describes bearing types and sizes; and bronze-bearing alloys.

19 BEARINGS—Federal-Mogul Corp, Detroit, Mich. 16-page booklet describes bearing research and engineering service for designers and manufacturers.

BELTS

20 V-BELT DATA—Manhattan Rubber Div, Raybestos-Manhattan, Inc, Passaic, N. J. Engineering data book divided into 2 parts. First part covers standard drives, and second covers sheave factors for designing new or special drives.

21 BELTS—Mechanical Goods Div, U.S. Rubber Co, 1790 Broadway, New York, N. Y. 34-page catalog, "Belting Biographies", presents novel descriptions of company's products, giving case history for each belt. Contains also technical data, including selection of proper belt, installation speed, pulley size, tension, etc, together with suggestions for improving belting methods.

22 BELTING—Manhattan Rubber Mfg Div, Raybestos-Manhattan, Inc, Passaic, N. J. Fourth edition of "Manhattan Rubber Products for Industry", covers all mechanical rubber goods made by company, including belting, hose, packing, molded rubber goods, industrial asbestos friction material, rubber roll coverings, tank linings, and abrasive wheels.

BLOWERS

23 BLOWERS — Roots-Connersville Blower Corp, Connersville, Ind. 20-page bulletin No. 120-B11 describes and illustrates single and multi-stage centrifugal blowers and exhausters. Pressure-volume curves and information regarding operating characteristics of equipment given.

24 BLOWERS—L J Wing Mfg Co., 154 W 114th St, New York, N. Y. De-

THEY GO 'ROUND AND 'ROUND TOGETHER!

There's No Sag, No Slip, No Uneven Wearing When You Use MATCHED SETS of Allis-Chalmers Texrope V-Belts! Read How They Can Help You Cut Your Power Transmission and Maintenance Costs!

NEW MEASURING MACHINE SHOWS EXACT length of belt to 1/100th of an inch . . . permits matching of belts into sets that carry the load TOGETHER!

There's a special reason why Allis-Chalmers Texrope V-Belts do their share of work equally, carrying the load TOGETHER! It's because they are sold in *matched sets!*

And matching Texrope belts is more than just taking units from the same mould or production run. Now — with a newly developed measuring machine — every belt is tested in a grooved sheave running under normal operating tension . . . and the exact length to 1/100 of an inch is registered on a finely calibrated meter.

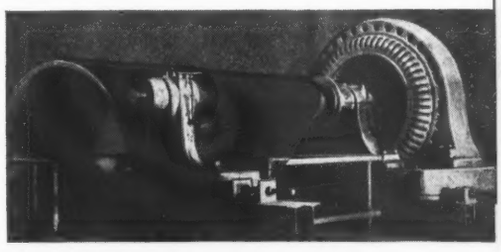
That's the kind of accuracy you want in the belts you buy for your plant. It means long, even wearing . . . and a transmission efficiency up to 98.9%!

Originally developed by Allis-Chalmers, Texrope multiple V-Belts are everywhere helping plant operators to cut costs. With these drives, there is no slipping . . . no jerking . . . no roar or hum. Production is made steady . . . maintenance costs on motors and drives are sharply reduced!

Cut Costs With Texropes!

Get in stride with the times . . . follow the lead of others who every day are cutting costs with Texropes. Learn how you can save in your plant with long-wearing Texrope Drives in *matched sets!*

There's a trained engineer in the district office near you who is backed by Allis-Chalmers 90 years of experience. He'll be glad to explain Texrope features . . . to show you how you can cut your power transmission costs. Call him today. Or write direct to Allis-Chalmers.



ALTHOUGH DRIVEN BY A 90 RPM diesel engine with extremely severe power impulses, the thirty six belts on this generator act as a unit, sharing the load equally . . . because they are matched as a set!

Vari-Pitch Speed Changers • Texrope V-Belts • Duro-Brace Texsteel Sheaves • Vari-Pitch Sheaves • Standard Cast Iron Sheaves • Adjustable Pitch Diameter Texsteel Sheaves • 2-3-4 Combination Sheaves • Straitline Automatic Motor Bases • Oil Field Drilling Rigs

Belts by Goodrich

TEXROPE DIVISION

ALLIS-CHALMERS

MILWAUKEE·WISCONSIN

scribes the why, how, where, and outstanding advantages of new type motor-driven blower, for application to high-pressure boilers to produce static pressure at low speed. Bulletin No. CO-3.

BOILERS

25 BOILERS—Henry Vogt Machine Co, Inc, Louisville, Ky. 14-page bulletin describes forged-steel sectional-header-type boiler.

26 BOILERS—Henry Vogt Machine Co, Inc, Louisville, Ky. 20-page bulletin describes Type ML-L low-head bent-tube boiler. Complete description given, and various typical installations are pictured.

27 BOILERS—Springfield Boiler Co, Springfield, Ill. 40-page catalog No. 35 covers design and construction of water-tube boilers and waterwalls. Several users pictured and booklet contains suggested rules for care and operation of power boilers.

28 BOILERS—Combustion Engineering Co, Inc, New York, N. Y. 40-page catalog BT-6 describes bent-tube boilers of 2-, 3-, and 4-drum types. Designs of units for capacities ranging from 100,000 to 1,000,000 lb per hr included.

29 SCOTCH BOILERS—The Brownell Co, Dayton, Ohio. 8-page bulletin No. B-8 explains Scotch boilers. Cross-sectional drawings and standard equipment for all boilers listed.

30 BOILERS—Edge Moore Iron Works, New York, N. Y. 4-page bulletin. No. 105 describes Edge Moore low-head water-tube boilers, with engineering data. Line drawings show construction of several types and installations are listed.

31 BOILERS—Cleaver-Brooks Co, Milwaukee, Wis. 8-page catalog describes and illustrates "Oilbilt" boilers, construction features and specifications.

BOILER ACCESSORIES

32 PULVERIZING MILL — Stephens-Adamson Mfg Co, Aurora, Ill. 12-page catalog No. 639 covers "Mosley Mill", attrition-type, air-swept pulverizer. Buyers' questionnaire included to aid in selection of proper type mill.

33 BOILER INSTRUMENTS — Brown Instrument Co, Wayne & Roberts Ave, Philadelphia, Pa. 18-page catalog lists all types of boiler instruments made by company, together with description and photographs of each.

34 TUBE DATA—Babcock & Wilcox Tube Co, 85 Liberty St, New York, N. Y. Technical bulletin 15 gives master weight tables for round seamless steel tubing, giving weights per ft for minimum wall and average wall tubes, hot-finished and cold drawn.

35 COMBUSTION CONTROL — Hagan Corp, 300 Ross St, Pittsburgh, Pa. 2-page illustrated folder tells story of combination of Hagan Corp, Hall Laboratories, Inc, and Buromin Corp, covering services contributed by each company toward combustion control and boiler water conditioning.

36 WATER COLUMNS—Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa. 20-page bulletin No. WG-1807 covers high-pressure water columns, medium-pressure water columns, and other types of columns and gages.

37 COMBUSTION CONTROL—Wheelco Instruments Co, 1929—1933 S Halstead St, Chicago, Ill. Single-page leaflet No. 1001-1 describes Model 1001 Flame-otrol combustion safeguard.

38 SCALE ERADICATOR—Xzit Sales Co, 1031 Clinton St, Hoboken, N. J. 4-page leaflet describes Xzit, said to be effective scale and soot remover for all types of furnace. Instructions for use given, and sample stack temperature charts shown, illustrating claims made.

39 STEAM PURIFICATION—Cochrane Corp, 17th Allegheny Ave, Philadelphia, Pa. 12-page bulletin on prevention of carryover of slugs of water from boiler under high load or normal conditions contains complete design and construction information.

40 FIRE OBSERVER—Detroit Stoker Co, General Motors Bldg, Detroit, Mich. 4-page leaflet No. 513 describes fire observer, device used in front of furnaces so operators can see condition of fire without opening doors.

41 BOILER-RETURN SYSTEM—Fred H Schaub Engrg Co, 325 West Huron St, Chicago, Ill. 20-page catalog 600 gives history, advantages, and principle of operation of Schaub boiler-return systems. Four systems described, and dimensions given for each. Bulletin No. 439A is supplement to Catalog 600, replacing several pages of dimensions and descriptions. Mailing piece describes newest system for returning condensate to boiler and supplying makeup water.

42 MECHANICAL - DRAFT EQUIPMENT—American Blower Corp, 6000 Russell St, Detroit, Mich. 34-page bulletin No. 3626 describes complete fan equipment for all types of mechanical draft, covering research, modern manufacturing methods, and individual articles on each type of fan.

43 CONDENSATE REMOVER — The Coe Mfg Co, Painesville, Ohio. 20-page catalog No. 903 on the Coe Drainator, a unit for the removal of condensate and air. Has no moving parts, no maintenance, no air vents, no bypasses and is continuous in operation. Uses thermodynamic properties of steam and hot water to actuate and regulate its own flow.

44 COMBUSTION CONTROL—Leeds & Northrup Co, Phila, Pa. 32-page catalog No. N-01-163 gives application of Metermax combustion control to all types of boiler furnaces. Diagrams describe how system works and reproductions of chart records show actual results obtained in central stations and industrial plants.

45 BOILER TUBES—Babcock & Wilcox Tube Co, 85 Liberty St, New York, N. Y. Technical Bulletin 11-B contains specifications established for carbon steel and alloy-steel tubes by ASTM and Association of American Railways, and standards set up by company for high-chrome and stainless-alloy tubes. Covers manufacture, finish, workmanship, chemical and physical properties, tests, permissible variations in weights and dimensions of tubes and pipes.

46 TUBE EXPANDERS—Gustav Weidecke Co, Dayton, Ohio. 8-page bulletin No. 65 gives specifications, features and prices of Ideal tube expanders. Typical cross-sectional layout of expanders presented, together with list of other Ideal flue tools.

47 PULVERIZERS AND CRUSHERS —Jeffrey Mfg Co, Columbus, Ohio. 32-page catalog No. 710 contains descriptions, method of operation and various types of swing-hammer pulverizers. Rack patterns, speeds and capacities included in tables, and list of crushable products given.

48 BOILER SERVICE UNITS—Roots-Connersville Blower Corp, Connersville, Ind. 6-page bulletin 260-B14C, with new price list L14E, describes automatic boiler-service units with Roots-Connersville turbine pumps, for breweries, laundries, dairies, and all plants using process steam.

49 CONTINUOUS BLOWDOWN — The Henszey Co, Watertown, Wis. 6-page booklet describes Henszey system of concentration control, which automatically blows down predetermined percentage of makeup, even if makeup varies. Explains briefly common enemies of efficient boiler operation.

49-A HEAT EXCHANGERS — Alco Products Div, American Locomotive Co, 30 Church St, New York, N. Y. 4-page booklet describes Alco heat exchangers, pressure vessels, and other products, including list of other vessels, piping, heaters, converters, etc, made.

50 TUBE CLEANERS — The Airtool Mfg Co, Springfield, Ohio. 6-page booklet No. 13 describes tube cleaners and cutter heads. Cutaway pictures of parts of cleaners are shown, followed with pictures of models of water-driven cleaners, expansion type cutting heads, and cleaners with mufflers and lubricators.

50-A WATER COLUMNS & GAGES—Ernst Water Column & Gage Co, Livingston, N. J. 20-page catalog lists and illustrates all types water columns and gages made by company. Types included are split-gland adjustable, for high or low pressures, and leakless super try cocks, for gages and columns.

51 COMBUSTION TESTERS — The Hays Corp, Michigan City, Ind. 4-page mailing piece concerns CO_2 analyzers and testers, including dry-type draft gage, liquid-type draft gage, Series 100 Test Set, and Analyzer AN1210, for CO_2 only.

52 CONTINUOUS BLOWDOWN SYSTEM—Elgin Softener Corp, Elgin, Ill. Booklet No. 510 presents a treatise on continuous blowdown systems for steam boilers. Need for such systems is illustrated by typical plant studies with charts.

CABLE, WIRE, FUSES

53 MAGNET WIRE & COILS—Anaconda Wire & Cable Co, 25 Broadway, New York, N. Y. 92-page catalog (C-352-second edition) contains information on magnet wire, physical and electrical properties, and magnet coils.

54 CABLE—General Electric Co, Schenectady, N. Y. Bulletin GEA-3215A describes new No. 1799 heat-resisting varnished cambric cable, with high dielectric strength, and lists ways in which use of new product saves money.

55 INSULATED CABLE — Anaconda Wire & Cable Co, 25 Broadway, New York, N. Y. 56-page catalog No. C-42 covers rubber-insulated power-cables. Physical and electrical characteristics given for each type, and section contains coding details of control-cables.

56 UNDERGROUND CABLE — Anaconda Wire & Cable Co, 25 Broadway, New York, N. Y. 4-page leaflet describes ANW cable for moist locations. Underwriters' Laboratory report shown, changing wire from miscellaneous classification to rubber covered status.

57 CONNECTORS—Burndy Engrg Co, 459 E 133rd St, New York, N. Y. 4-page leaflet No. 5054 describes Burndy Servits, for connecting copper-to-copper and aluminum-to-copper conductors.

58 CONTROL CABLE—General Electric Co, Schenectady, N. Y. "Thinwol" control cable is described in bulletin GEA-2423A, which also includes advantages, specifications and construction.

59 CABLES—Rockbestos Products Corp, New Haven, Conn. Handbook-catalog No. 10-E illustrates and describes wires, cables, and flexible cords designed for use where electric wiring, either in conduit or open, is exposed to heat, fire, corrosive fumes, vapors, oil or grease. Contains 2 indexes, and enlarged standard specifications with summary of NEMA standards for asbestos and asbestos-varnished cambric-insulated wires, etc.

60 CABLE CONNECTORS—Delta-Star Electric Co, Chicago, Ill. 8-page pictorial index lists all connectors carried in Bulletin 38-D, with convenient page listings. Includes all types of connectors, fittings, lugs, bolts and nuts.

61 POWER FUSES — Westinghouse Electric & Mfg Co, East Pittsburgh, Pa. 6-page illustrated leaflet No. F8450 describes advantages and operation of the Westinghouse boric-acid fuse.

62 WIRE & CABLE—Rockbestos Products Corp, New Haven, Conn. 10-E Handbook-Catalog contains summary of NEMA standards for asbestos and asbestos-varnished cambric insulated wires and

(*Continued on page* 112)

20 YEARS AT HARD LABOR!

Lo-Maintenance Motors Set Outstanding Low Cost Performance Record! Find Out How You Can Get Extra Dollar-for-Dollar Value . . . with Full Measure Constructed Lo-Maintenance Motors!

HERE'S THE LO-MAINTENance Motor that set a record of 20 years on the job with no time outs for repairs. And it's still going strong today!

If you are like executives who want the most from the equipment they buy . . . you've acquired the "long view." You want to know what your equipment will do . . . not only today . . . but for years to come!

Back in 1919, a large mid-western brewery bought an Allis-Chalmers Lo-Maintenance Motor. They figured it was a good investment . . . but they never realized the dividend that Lo-Maintenance Motor would pay them in staying on the job with no time-outs for repairs!

They didn't pamper that motor! They put it in a spot exposed to heat and moisture . . . hooked it to a pump . . . and put it to work 24 hours a day!

Not One Cent for Repairs!

Today—20 years later—here's the record! Not one cent has been spent for motor repairs! But that's not all! That Allis-Chalmers Lo-Maintenance Motor is doing as good a job for that brewery as the day it was installed!

That's why the chief engineer standardizes on Lo-Maintenance Motors in his plant. And that's why Lo-Maintenance Motors are fast becoming standard equipment in hundreds of other plants throughout the country.

You'll like the protection against breakdowns the high carbon steel frame and indestructible rotor and stator give you! The full Measure Construction with no skimping on materials that means longer life . . . less servicing . . . extra years of trouble-free service!

Get the whole story of the motor with more than just a rated horsepower . . . the motor that actually beats conditions that many times wreck ordinary motors! Call the trained production engineer in the Allis-Chalmers District Office near you. Let him show you how you can cut frequent time outs . . . reduce man hours lost due to motor failures . . . get longer motor life . . . with Allis-Chalmers Lo-Maintenance Motors!

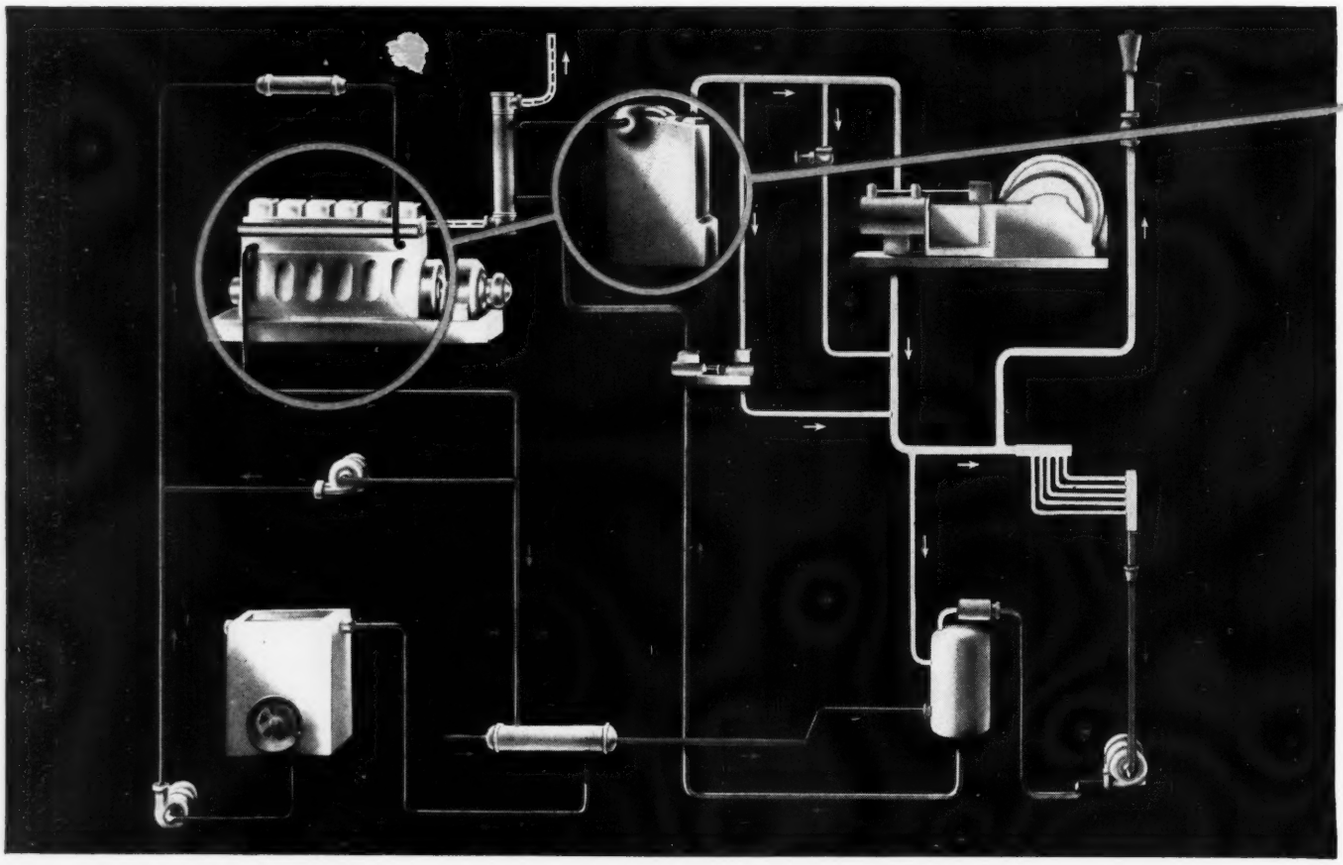
A1129

. . . 90 Years of Engineering Superiority Work for You When You Specify Allis-Chalmers!

ELECTRICAL DIVISION
ALLIS-CHALMERS
MILWAUKEE · WISCONSIN

FROM *GOOD* POWER HOOKUPS

FOR DIESEL APPLICATION...



Courtesy — Power, Dec. 1938

HOOKUP #13 **Diesel-steam combination is operated to match power and steam requirements closely in this office building. Steam engine and auxiliary exhaust supplies vacuum heating system. Diesel jacket water makeup and temperature of feed is given final boost by exhaust-gas heater. Indoor tower cools jacket water under control of thermostatic valve which divides flow between two circuits shown. Load is shifted from steam to diesel to avoid blowing steam to atmosphere.**

MANY FACTORS influence the satisfactory operation of power plants—not the least of which is the proper placement of valves. Going further, valves should be designed and built for the specific service...but at the same time offer you a choice of several styles and patterns to fit your own preferences or circumstances.

To demonstrate this, has been the primary objective of the diagrams and reference charts which we have offered in this space during the past year.

Since this is an actual installation, and a complete listing of Jenkins Valves available for each service would be impossible in the limited space, we have listed only one valve of each type under each pressure. A comprehensive selection of valves for any one unit or service may be obtained by referring to previous advertisements in the series.

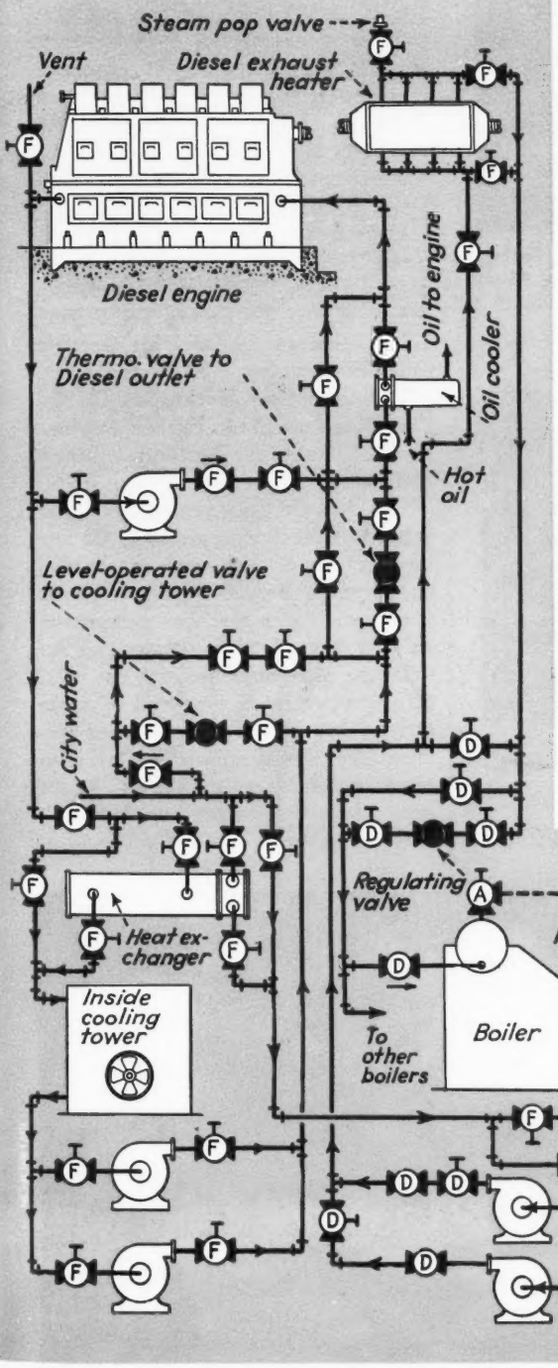
You will find the whole presentation conveniently assembled in a booklet "Jenkins Recommends..."—sent on request.

IN VALVES *Jenkins* GIVES YOU EVERYTHING

. . . TO *GOOD* VALVE PRACTICE

Jenkins RECOMMENDS . . .

COMBINATION STEAM AND DIESEL PLANT



REFERENCE CHART FOR JENKINS FIGURE NUMBERS

		100 lbs S.P	Up to 200 lbs. S.P	Up to 300 lbs. S.P	Up to 400 lbs S.P	Up to 600 lbs. S.P.
A	BOILER STOP AUTOMATIC EQUALIZING STOP AND CHECK NON-RETURN	IRON 293 Fl. I.B.B.M.	IRON 293 Fl. I.B.B.M STEEL 1055 Fl. 30 Series	STEEL 1055 Fl. 30 Series	STEEL 1057 Fl. 40 Series	STEEL 1059 Fl. 60 Series
B	HEADER GLOBE	IRON 142 Fl. Disc Type 913 Fl. Regrinding	IRON 162 Fl. Disc Type 923 Fl. Regrinding STEEL 1042 Fl. 30 Series	STEEL 1042 Fl. 30 Series	STEEL 1044 Fl. 40 Series	STEEL 1046 Fl. 60 Series
	GATE	IRON 651 Fl. O.S. & Y.	IRON 204 Fl. O.S. & Y STEEL 1010 Fl. 30 Series	STEEL 1010 Fl. 30 Series	STEEL 1011 Fl. 40 Series	STEEL 1012 Fl. 60 Series
C	ENGINE STOP VALVE GLOBE	IRON 913 Fl. Regrinding	IRON 923 Fl. Regrinding STEEL 1042 Fl. 30 Series	STEEL 1042 Fl. 30 Series	STEEL 1044 Fl. 40 Series	STEEL 1046 Fl. 60 Series
D	BOILER FEED STOP AND CHECK GLOBE	BRONZE 630 Sc. Disc Type	BRONZE 638 Sc. Disc Type	BRONZE 638 Sc. Disc Type STEEL 30 Series	STEEL 40 Series	STEEL 60 Series
	SWING CHECK	BRONZE 352 Sc Disc Type 762 Sc Regrinding	BRONZE 260 Sc. Disc Type 962 Sc. Regrinding	BRONZE 260 Sc Disc Type 962 Sc. Regrinding STEEL 1026 Fl. 30 Series	STEEL 1027 Fl. 40 Series	STEEL 1028 Fl. 60 Series
	HORIZONTAL LIFT CHECK	BRONZE 117A Sc. Disc Type 756 Sc. Regrinding	BRONZE 807 Sc. Disc Type 263 Sc. Disc Type 966 Sc. Regr-Renew	BRONZE 263 Sc Disc Type 966 Sc Regr-Renew 994 Sc Bolted Cover Regr-Renew STEEL 30 Series	STEEL 40 Series	STEEL 60 Series
	GLOBE	BRONZE 106A Sc. Disc Type 750 Sc. Regrinding 950 Sc. Regr-Renew	BRONZE 801 Sc. Disc Type 1140 Sc Regrinding 1150 Sc. Regr-Renew	BRONZE 970 Sc Regr-Renew 982 Sc Regr-Renew Bolted Bonnet STEEL 1042 Fl. 30 Series	STEEL 1044 Fl. 40 Series	STEEL 1046 Fl. 60 Series
		STANDARD	MEDIUM	EXTRA HEAVY		
E	OPEN HEATER STEAM GATE	BRONZE 47 Sc Travel Spind. 370 Sc Non-Rising IRON 326 Fl Non-Rising 651 Fl O.S. & Y	BRONZE 270 Sc Non-Rising 275 Sc O.S. & Y IRON 255 Fl. Non-Rising 253 Fl O.S. & Y	BRONZE 280 Sc.Non-Rising 282 Sc. O.S. & Y. IRON 203 Fl Non-Rising 204 Fl. O.S. & Y.		
	GLOBE	BRONZE 106A Sc. Disc Type IRON 613 Fl. Regrinding 142 Fl. Disc Type	BRONZE 750 Sc Regrinding 950 Sc. Regr-Ren. IRON 919 Fl. Regrinding 775 Fl. Disc Type	BRONZE 801 Sc Disc Type 1140 Sc Regrinding 1150 Sc Regr-Renew 970 Sc Regr-Renew IRON 923 Fl Regrinding 162 Fl Disc Type		
F	WATER SUPPLY TO HEATERS AND DIESEL COOLING GATE	BRONZE & IRON Same as "E" above	BRONZE & IRON Same as "E" above	BRONZE & IRON Same as "E" above		
	SWING CHECK	BRONZE 352 Sc Disc Type 762 Sc. Regrinding IRON 624 Fl. Regrinding 295 Fl. Disc Type	BRONZE 762 Sc Regrinding 260 Sc. Disc Type IRON 339 Fl. Disc Type	BRONZE 260 Sc. Disc Type 962 Sc. Regrinding IRON 339 Fl. Disc Type		
	GLOBE	BRONZE & IRON Same as "E" above	BRONZE & IRON Same as "E" above	BRONZE & IRON Same as "E" above		

Motor-operated Iron and Steel Valves can be supplied. Cast Steel Valves with ends for welding can be supplied.

JENKINS BROS., 80 WHITE STREET, NEW YORK, N. Y.

Bridgeport • Boston • Chicago — Philadelphia • Atlanta • Houston

1864—1939 DIAMOND ANNIVERSARY

#13 OF A SERIES designed to help in your selection of JENKINS VALVES

ASME Highlights, Awards

A few of the 650 engineers who enjoyed Tuesday evening's smoker: left to right, John Gerber, W H Aldrich, Cleveland Electric Illuminating Co; H G Thielscher, Potomac Electric Power Co; Clarke Freeman, Providence; and James W Parker, Detroit Edison Co

FOR THE FIRST TIME in ASME history, the annual meeting was held outside of New York City. Through its committees and through solid support by local members, Philadelphia made a wonderful showing, so much so as to create a demand for another out-of-New-York annual meeting.

Official registration totaled 2250, but actual attendance exceeded 2500. Every social event was a sell-out, with 650 at the Tuesday night smoker (Dec 5), 1100 at Wednesday's banquet and 400 at the general luncheon on Thursday.

Of greatest significance to power engineers was the posthumous award of the John Fritz Medal to Clarence Floyd Hirshfeld, Chief of Research for Detroit Edison until his death on April 11, 1939. With William L Batt presiding, the certificate was received by James Hirshfeld, son of Dr. Hirshfeld, after a glowing citation by James W Parker of Detroit Edison.

In essence, the award was made for "notable leadership through research and development in power generation and electric traction, and for being a great teacher and friend of man, both young and old."

The John Fritz Medal is an honor given annually and jointly by the four "founder" engineering societies for notable scientific achievement.

Other awards at the annual dinner included: Charles T Main Award to James R Bright of Swampscott, Mass.; Pi Tau Sigma Medal to Prof John I Yellott, Jr, of Stevens Institute; honorary memberships to Dean Emeritus Dexter S Kimball of Cornell and Charles T Main, consulting engineer, Boston, Mass.

ASME Secretary C E Davies greets President-elect Warren H McBryde as President A G Christie looks on approvingly

In his address, retiring president A G Christie urged the better cooperation of industry in the post-graduate training of engineers. President-elect Warren H McBride of San Francisco promised a year of devoted attention to Society affairs in a position that will force him to become a transcontinental commuter, making the round trip from Coast to Coast about every six weeks.

Inspection trips included Edward G Budd Mfg Co, General Electric Switchgear Works, Baldwin Locomotive Works, Curtis Publishing Co, Schuylkill Station of Philadelphia Electric Co, Westinghouse, SKF Industries, Philadelphia Gear Works, Sun Oil Co, Conowingo and Safe Harbor (hydro) plants, Leeds & Northrup, Brown Instrument Co.

The Sun Oil trip was of particular interest as the first opportunity for any large group of American mechanical engineers to inspect a gas turbine in operation. This machine compresses air for the Houdry process of oil refining. All power to drive the axial turbo-compressor is generated by a gas turbine fed with hot compressed gas from the Houdry process. Excess power generates up to 500 kw. At the same plant, the visitors saw America's only Velox boiler installation.

J N Landis, Consolidated Edison Co of N Y (left) and L W Wallace, Crane Co (center), seem deeply interested in the dinner meeting of Council and local sections delegates

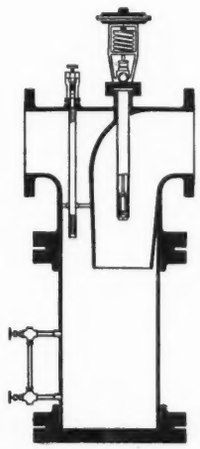
PARTIAL LIST OF ORDERS RECEIVED

FOR THE COPES FLOWMATIC REGULATOR

USER AND LOCATION	DATE	BOILER DATA NO.	MAKE	WSP LB.	MAX.EVAP. LB./HR.
Canadian Chemical Plant	1939	1	F-W	80	20,000
Canadian Mining Plant	1939	1	B & W	175	66,000
Canadian Steel Mill	1937	1	Freyn	130	25,000
and	1939	1	Freyn	130	25,000
Colorado Sugar Mill	1939	1	C-E	155	115,000
Connecticut Industrial Plant	1937	2	Riley	700	90,000
Connecticut Industrial Plant	1939	1	E. M.	200	70,000
Connecticut Utility Plant	1938	1	B & W	675	125,000
and	1939	1	B & W	675	125,000
Georgia Textile Mill	1939	1	B & W	425	80,000
Illinois Industrial Plant	1937	2	Riley	700	90,000
Illinois Mining Plant	1938	1	E. M.	120	60,000
Illinois Refinery Plant	1939	1	Riley	650	120,000
Illinois Utility Plant	1939	2	B & W	670	350,000
Iowa Institutional Plant	1939	1	B & W	185	52,000
Iowa Utility Plant	1939	1	C-E	725	100,000
Kansas Utility Plant	1938	2	F-W	650	70,000
Kansas Utility Plant	1939	1	B & W	420	185,000
Maryland Textile Mill	1937	2	Riley	450	200,000
Massachusetts Industrial	1939	1	B & W	600	65,000
Massachusetts Industrial	1939	2	Riley	650	50,000
Massachusetts Utility Plant	1939	4	B & W	1300	300,000
Michigan Chemical Plant	1938	1	F-W	1325	300,000
Michigan Paper Mill	1937	1	Baden.	550	110,000
Michigan Paper Mill	1939	1	C-E	650	48,000
Michigan Rubber Mill	1937	3	Lasker	425	30,000
Michigan Utility Plant	1937	1	B & W	850	400,000
Michigan Utility Plant	1938	1	F-W	875	400,000
and	1939	1	F-W	875	400,000
Michigan Utility Plant	1939	2	F-W	875	400,000
Missouri Industrial Plants	1938	1	Erie	450	90,000
Missouri Utility Plant	1938	1	B & W	225	120,000
and	1938	2	W & W	180	110,000
Nebraska Utility Plant	1938	3	B & W	400	140,000
Nebraska Utility Plant	1938	2	C-E	475	200,000
New Jersey Industrial Plant	1938	2	C-E	450	65,000
New Jersey Industrial Plant	1939	2	B & W	155	60,000
New Jersey Paper Mill	1939	1	B & W	400	115,000
New York Brewery Plant	1938	3	C-E	410	75,000
New York Housing Project	1939	4	F-W	500	135,000
New York Industrial Plant	1938	1	Baden.	650	100,000
New York Salt Plant	1939	1	Riley	200	150,000
North Carolina Paper Mill	1938	2	C-E	440	35,000
Ohio Leather Plant	1939	1	Erie	110	75,000
Ohio Steel Mill	1938	2	B & W	415	330,000
Ohio Textile Mill	1937	1	Vogt	500	85,000
Pennsylvania Industrial	1938	1	Vogt	450	100,000
Pennsylvania Paper Mill	1938	1	Sprgfld	600	100,000
and	1939	1	Sprgfld	600	100,000
Pennsylvania Paper Mill	1939	1	B & W	610	125,000
Pennsylvania Steel Mill	1938	1	B & W	400	85,000
and	1939	1	B & W	400	85,000
Pennsylvania Steel Mill	1938	3	Erie	250	150,000
Pennsylvania Steel Mill	1939	1	B & W	165	50,000
Pennsylvania Steel Mill	1939	1	F-W	660	150,000
Pennsylvania Utility Plant	1937	1	B & W	675	200,000
Pennsylvania Utility Plant	1937	1	F-W	875	400,000
Texas Chemical Plant	1937	1	B & W	400	200,000
Texas Refinery Plant	1937	1	Riley	600	350,000
Texas Utility Plant	1937	1	Riley	450	160,000
Virginia Textile Mill	1939	2	B & W	600	75,000
Virginia Utility Plant	1939	1	C-E	225	80,000
Washington Ship Yard	1939	1	B & W	450	125,000
Washington Utility Plant	1939	1	C-E	690	550,000
West Virginia Mining Plant	1939	3	C-E	167	45,000

Name of any user listed above will be furnished on request

They're getting *more* for their money with COPES Flowmatic



Users of the simplified COPES Flowmatic Regulator get more for their money because of safer, more efficient, more dependable performance. Safer—because of closer boiler water level control on their most rapidly swinging loads. More efficient—because feed input is more accurately geared to steam output. More dependable—because only routine attention is needed to assure trouble-free service, and because the COPES is independent of all other control and metering systems, not subject to their outages. These are good reasons why the number of satisfied users is growing so rapidly. If you want more for the money you invest in feed water regulation, specify the fully automatic, two-element COPES Flowmatic. Write for Bulletin 409-B.

NORTHERN EQUIPMENT CO., 1221 GROVE DRIVE, ERIE, PA.

Feed Water Regulators, Pump Governors, Differential Valves
Liquid Level Controls, Reducing Valves and Desuperheaters

BRANCH PLANTS IN CANADA, ENGLAND, FRANCE, GERMANY AND ITALY
REPRESENTATIVES EVERYWHERE

. . . and with COPES Reducing and Desuperheating Stations

You get more for your money in COPES Pressure Reducing and Desuperheating Stations. You get the long life and trouble-free fully-automatic service built into all COPES equipment, plus the uncanny accuracy of control made possible by exclusive design features. Reducing Valves are better balanced, more accurately calibrated. Desuperheaters more accurately proportion cooling water to steam on all flows from maximum to minimum. Write us about your operating requirements.

★ GET CLOSER LEVEL CONTROL WITH THE COPES FEEDS BOILER ACCORDING TO STEAM FLOW-AUTOMATICALLY FLOWMATIC ★ REGULATOR

cables, governing materials, manufacture, ratings, and dielectric tests.

63 FLUORESCENT LAMP — General Vapor Lamp Co, 410 8th St, Hoboken, N. J. 8-page bulletin No. 522 discusses characteristics of 100-watt Cooper-Hewitt Fluorescent Lamp for general industrial lighting. Contains detailed descriptions of features of lamp: high light output, high efficiency, long life, blue-white light, low installation cost, rectified dc arc circuit and dust-tight auxiliary equipment.

CLEANING EQUIPMENT

64 INDUSTRIAL CLEANING—Oakite Products, Inc, 22 Thames St, New York, N. Y. Anniversary brochure presents major industries, and how each uses cleaning to keep in operation. Commemorates completion of 30 years of service.

65 VACUUM CLEANER—Spencer Turbine Co, Hartford, Conn. 12-page mailing piece tells how Spencer cleaners will aid users in all branch of industry.

66 TUBE CLEANERS—Thomas C Wilson, Inc, 55 Vandam St, New York, N. Y. 32-page catalog No. 39 deals with Wilson air or steam motors for tube cleaners, showing several types of motor and listing all models of cleaners, from those for short straight tubes, to those for more difficult jobs on bent tubes. Cutter heads and tube brushes, together with hose and couplings, lubricators and electrically operated cleaners included.

67 VACUUM CLEANERS—U. S. Hoffman Machinery Corp, 105 Fourth Ave, New York, N. Y. 8-page booklet Form A-303-15M outlines and describes numerous models of industrial vacuum cleaners, and advantages of each type.

68 BLAST CLEANER—Pangborn Corp, Hagerstown, Md. 16-page bulletin No. 211 describes "Airless" methods of table-blast-cleaning fragile metals and ceramic parts. Covers mechanical operation of "Roto-blast" cleaning tables.

COAL- & MATERIALS-HANDLING EQUIPMENT

69 HANDLING DEVICES — Barrett-Cravens Co, 3255 W 30th St, Chicago, Ill. 175-page "vest pocket" catalog illustrates and describes 176 different materials-handling devices. Besides line of lift trucks, portable elevators and container storage systems, shows the Torpedo Electric Hoist.

70 ASH HANDLING—Allen-Sherman-Hoff Co, 225 S Fifteenth St, Philadelphia, Pa. 36-page catalog No. 639A describes Hydrojet ash handling systems, including installations for continuous or intermittent slag-tap furnaces, dry-bottom furnaces, and stoker-fired furnaces.

71 CONVEYORS—Atlas Conveyor Co, Clintonville, Wis. 12-page Catalog No. 211-C describes Atlas belt conveyors, car unloaders, and scraper conveyors for handling sand, gravel, coal and coke.

72 SCREENS—Robins Conveying Belt Co, 15 Park Row, New York, N. Y. 10-page bulletin No. 105 explains construction and operating principle of Vibrex screens, Style "H" and "J".

73 CONVEYORS — United Conveyor Corp, 37 W Van Buren Street, Chicago, Ill. 24-page booklet contains information regarding Hydroveyor, a pneumatic conveyor used primarily to handle flyash, soot, dust and coal siftings.

74 MONORAIL SYSTEMS — American Monorail, 13107 Athens Ave, Cleveland, Ohio. 47-page booklet No. 5M shows the solution of handling problems with the use of Monorail and advantages over other systems.

75 CONVEYORS—Osborn Mfg Co, 5401 Hamilton Ave, Cleveland, Ohio. Bulletin No. L-10M describes the Johns conveyor. Principle of the conveyor is explained, and details given on several installations used to carry coal, etc.

76 COAL HANDLING — Richardson Scale Co, Clifton, N. J. 40-page booklet, Bulletin No. 6239, entitled "Coal," describes various Richardson coal-handling equipment, including coal larries, scales, etc.

77 CONVEYORS—Standard Conveyor Co, North St. Paul, Minn. 44-page catalog No. 2 describes roller-conveyor systems for steel mills and foundries. Suggested arrangements pictured, with all operations worked out. Cutaway and sectional drawings show construction of conveyors.

78 COAL HANDLING—Chain Belt Co, Milwaukee, Wis. 65-page catalog 334 describes Rex coal-handling installations. Drawings of typical uses of system pictured.

79 CONVEYORS—Link Belt Company, 307 N Michigan Ave, Chicago, Ill. Illustrated booklet No. 1630 gives ideas for handling materials mechanically with overhead conveyors.

COOLING TOWERS

80 COOLING TOWERS—The Marley Co, Fairfax & Marley Roads, Kansas City, Kan. Bulletin No. 301 describes Marley forced-draft cooling towers, with advantages, features, and mechanical description.

81 SPRAY NOZZLES—The Marley Co, Fairfax & Marley Roads, Kansas City, Mo. Bulletin No. 102 covers water-cooling spray nozzles, showing how they are made and where they are used.

82 COOLING TOWERS—The Marley Co, Fairfax and Marley Roads, Kansas City, Kan. Bulletin No. 503 covers "small series" steel induced-draft cooling towers for outdoor service.

83 COOLING TOWERS—The Marley Co, Fairfax and Marley Roads, Kansas City, Kan. Bulletin No. 201 describes atmospheric spray-type cooling towers, covering operation and applications.

84 SPRAY NOZZLES—The Marley Co, Fairfax and Marley Roads, Kansas City, Kan. Bulletin No. 56-A covers spray pond equipment, including spray nozzles, group castings, and other accessories.

COMPRESSORS & ACCESSORIES

85 RECEIVERS — Ingersoll-Rand Co, 11 Broadway, New York, N. Y. 4-page bulletin, Form 9202, gives specifications, features and advantages of standard 125-lb and high-pressure receivers for air or gas.

86 COMPRESSORS—Ingersoll-Rand, 11 Broadway, New York, N. Y. 32-page catalog No. 7502-J describes Type 30 compressors and vacuum pumps. Includes sections on selecting proper compressor, advantages and detailed descriptions of each model.

87 COMPRESSORS — Chicago Pneumatic Tool Co, 6 E 44th St, New York, N. Y. Bulletin No. 762 (second edition), describes 700-cu-ft, portable, diesel-driven compressor.

88 COMPRESSORS — Chicago Pneumatic Tool Co, 6 E 44th St, New York, N. Y. Supplement B to bulletin 726 covers class O-CTE horizontal, tandem-duplex, motor-driven compressor.

89 COMPRESSORS — Ingersoll-Rand Co, 11 Broadway, New York, N. Y. 24-page No. 3063-A describes and illustrates Class "ES" heavy-duty compressors, in sizes from 2 to 125 hp.

90 COMPRESSORS — Ingersoll-Rand Co, 11 Broadway, New York, N. Y. 56-page form 3426 covers Class PRE compressors equipped with channel valve, sizes from 200 to 300 hp, electric-driven, direct-connected, for heavy-duty service.

91 COMPRESSORS — Ingersoll-Rand Co, 11 Broadway, New York, N. Y. 32-page form 3364 announces new line of 2-stage, air-cooled, portable compressors, equipped with channel valve.

92 COMPRESSORS — Ingersoll-Rand Co, 11 Broadway, New York, N. Y. 32-page form 3262 covers duplex, heavy-duty compressors, types XRE, XRB, and XCB. Cross-section illustration shows features and construction. Low- and high-pressure diagrams show clearance control at five load points.

93 COMPRESSORS — Ingersoll-Rand Co, 11 Broadway, New York, N. Y. 28-page form No. 3166 on the "Motor-compressor", combined air-cooled motor and 2-stage compressor, shows application in industry, construction, advantages, features, and illustrates various models.

94 AFTERCOOLERS — Pennsylvania Pump & Compressor Co, Easton, Pa. 8-page bulletin 186 contains sectional drawings, photographs, and descriptions of various types of aftercoolers made by company. Accompanying curve shows thermal result of single-stage air compression.

95 COMPRESSORS — Worthington Pump & Machinery Co, Harrison, N. J. No. L-611-B8 describes single-cylinder, single-stage, feather valve compressor, Types HB & HS.

96 COMPRESSORS — Worthington Pump & Machinery Co, Harrison, N. J. No. H-850-B6 covers Aero, 2-stage, full-diesel-drive, portable compressor.

97 COMPRESSORS — Schramm Inc, West Chester, Pa. 16-page bulletin 3907-Po, presents line of "Utility" stationary air compressors 85 to 600 cu ft capacity. Assortment of assemblies listed, from single compressor unit to complete air plants.

98 COMPRESSOR-STARTER — Quincy Compressor Co, 217 Main St, Quincy, Ill. 2-page mailing piece describes 2-stage, air-cooled compressor used for starting diesels, available with either motor or engine drive. Various parts illustrated.

99 COMPRESSORS — Pennsylvania Pump & Compressor Co, Easton, Pa. Bulletin No. 184 describes single-stage roller-bearing compressor. Regulation, control, and operation included.

100 COMPRESSORS — Worthington Pump & Machinery Corp, Harrison, N. J. Bulletin H-850-B52 pictures Model TS-105 portable compressor. Engine and compressor construction shown.

CLUTCHES & COUPLINGS

101 FLEXIBLE COUPLING—Lovejoy Flexible Coupling Co, 5009 W Lake St, Chicago, Ill. 14-page catalog covers L-R couplings, Types IA, IAU, W, WQ, F, and P. Chart provides coupling selector for Types W and WF couplings.

102 FRICTION CLUTCHES—Carlyle Johnson Machine Co, Manchester, Conn. Standard type of friction clutch with metal-to-metal frictions, as well as Super-Johnson type with Raybestos faced expansion-ring, described in 10-page catalog.

103 FLEXIBLE COUPLINGS—Thomas Prosser & Son, 120 Wall St, New York, N. Y. 4-page booklet No. D3702 describes the functions of the flexible coupling, the principles of flexible-coupling design, main advantages of the "David Brown" coupling.

104 FLEXIBLE COUPLINGS—Morse Chain Co, Ithaca, N. Y. 32-page bulletin No. 57 contains engineering data, installation and operating information on entire line of Morse flexible couplings, Silent Chain couplings, Roller Chain couplings, Morflex couplings, Morflex Radial couplings and universal drive shafts.

DIESELS & ACCESSORIES

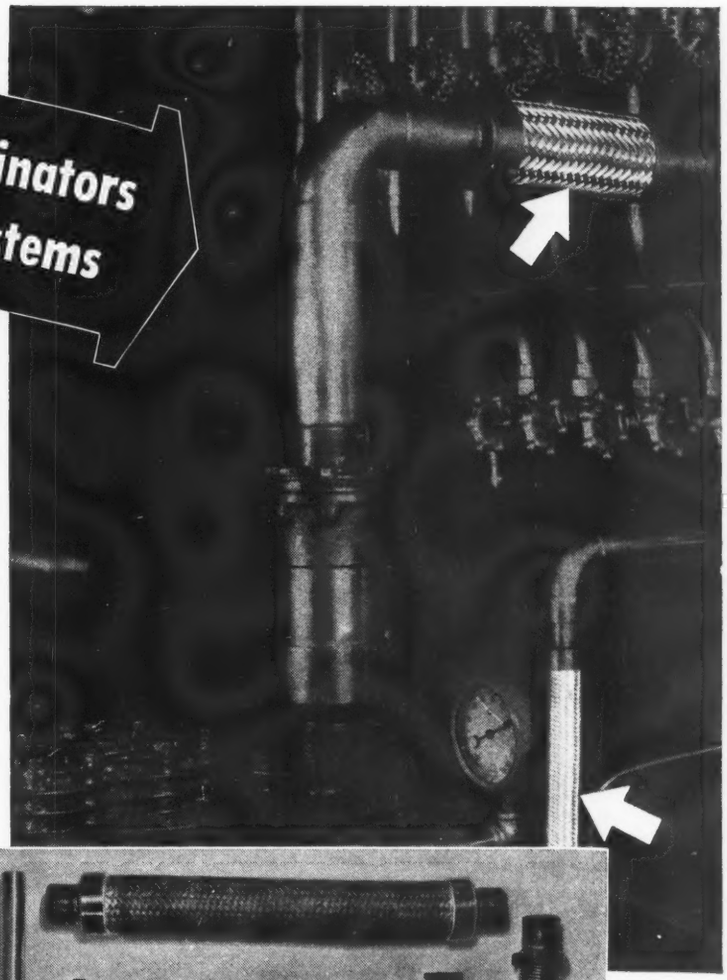
105 SILENCERS—Burgess Battery Co, 500 West Huron St, Chicago, Ill. 14-page booklet covers recently developed Burgess Snubbers, for internal-combustion engines. Applications and construction shown in photos and diagrams.

106 JACKET-WATER COOLERS—Worthington Pump & Machinery Co, Harrison, N. J. 6-page bulletin S-500-

Whenever you need a flexible connector for liquids or gases, use

American Seamless Flexible Metal Tubing

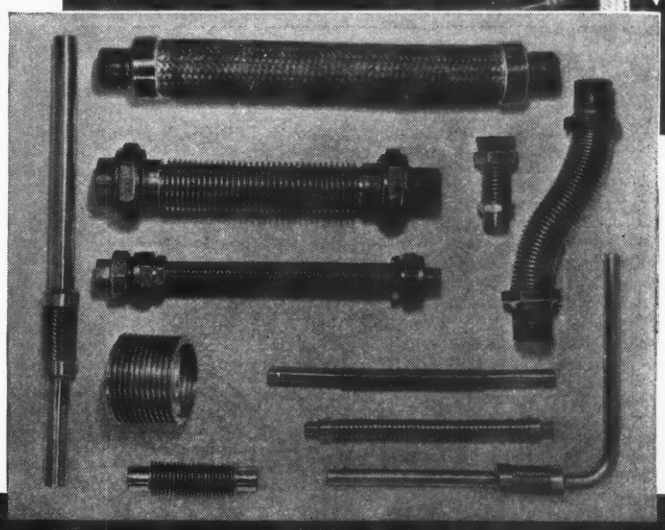
Example: Vibration Eliminators for air-conditioning systems



FOR permanent tightness in liquid or gas lines...for protection against breakage or leakage under constant flexing...for the elimination of excessive vibration, there's only one 100% correct answer to your problem. You need flexible tubing that's free of laps, seams, welds or joints of any kind. One that's made of strong, *seamless* metal tubes. And that means American Seamless Flexible Metal Tubing.

"American Seamless" is used regularly in thousands of applications for carrying steam, oil, air, liquids and gases for heating, cooling or lubricating machine parts that must move frequently; for absorbing vibration in rigid pipe lines; for quick and economical connection of misaligned parts.

When you have a flexible connector problem, put it up to our Engineering Department. Meanwhile, write for our new reference Catalog SS-25. 39237



RIGHT: *Just a few of the many hundreds of special flexible tubing assemblies that we have designed—each to perform a specific duty.*

American Metal Hose

ANACONDA from mine to consumer

AMERICAN METAL HOSE BRANCH of THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Conn. • Subsidiary of Anaconda Copper Mining Company

B37 gives features, piping arrangements, and capacity ratings for Models 1-C, 2-C, 3-C, and 4-C evaporative coolers.

107 SPARK ARRESTERS—Air-Maze Corp, 5200 Harvard Ave, Cleveland, Ohio. 2-page leaflet, form SAU-109 describes exhaust spark arresters for internal-combustion engines, and includes table for determining type of arrester to use with particular engine.

108 DIESEL-ELECTRIC UNITS—The Buda Co, Harvey, Ill. 8-page bulletin No. 963 describes Buda diesel-electric units, with Lanova system of combustion. Each part of unit explained separated.

109 DIESELS—Ingersoll-Rand Co, 11 Broadway, New York, N. Y. 40-page bulletin on Type S diesels covers a heavy duty, continuous-service engine for stationary or marine service. Contains many illustrations of engine parts.

110 DIESEL—Worthington Pump & Machinery Corp, Harrison, N. J. Bulletin S-500-B5E explains construction of 4-cycle diesel, direct-injection Type "E". Piston rod, crankshaft, etc, construction given, operation described.

111 DIESEL SAFETY CONTROL—Fulton Sylphon Co, Knoxville, Tenn. Form SF-522 describes safety control unit that shuts off diesel before oil pressure gets too low or jacket-water temperature becomes excessive. Typical layouts of unit pictured.

112 FUEL-INJECTION EQUIPMENT—Diesel Equipment Corp, Chicago, Ill. 52-page bulletin describes new line of fuel-injection equipment of all types and sizes for compression and spark-ignition oil engines. Includes standard single-unit injection pump and standard fuel injector.

113 DIESELS—Worthington Pump & Machinery Corp, Harrison, N. J. 8-page bulletin No. S-500-B36 covers Type CC vertical, 4-cycle, direct-injection diesel. All engine-parts described in detail, showing construction.

114 DIESEL ENGINES—Covic Diesel Division, Northill Co, Inc, Los Angeles, Cal. 6-page booklet, 100 T-2-PG, describes the Covic diesel. A cross-sectional view of one of the small engines is given, with various uses and industries to which it may be adapted.

DUST COLLECTORS

115 DUST COLLECTORS—Pangborn Corp, Hagerstown, Md. Folder No. 2045, entitled, "You may not notice his DAILY WAGES", is fifth in series in fight for dust control. Story tied in with photos and descriptions of Pangborn Dust Collectors. Folder No. 2046, "DUST HOGS have babies" is sixth in series, dealing with soot, smudges, and other "by-products" of dust, leading to breakdowns, etc.

116 DUST COLLECTORS—W W Sly Mfg Co, 4700 Train Ave, Cleveland, Ohio. 24-page booklet, No. 90 describes operation of Sly dust filter. Contains engineering data and typical installation layouts. Includes questionnaire for prospective user.

117 DUST COLLECTORS — Research Corp, 405 Lexington Ave, New York, N. Y. 16-page bulletin issued jointly with Western Precipitation Corp, Los Angeles, covers Multiclone dust collectors and accessories. Law of cyclonic collection explained in non-technical terms.

ELECTRICAL METERS & INSTRUMENTS

119 INSULATION TESTER—Roller-Smith Co, 1766 W Market St, Bethlehem, Pa. Catalog 11-a describes "Hipot" insulator and bushing tester. Construction, advantages, and method of operation given. Catalog 11-b gives new applications of tester.

120 VOLTAGE REGULATOR — Burlington Instrument Corp, Burlington, Iowa. 3-page bulletin GB-1, describes low-priced generator voltage regulator for small generating units.

121 DEMAND METERS—General Electric Co, Schenectady, N. Y. GEA-3226 is reprint of first section of demand meter catalog, GEA-612D. Presents all models, and gives applications for each.

122 VOLTAGE REGULATORS—General Electric Co, Schenectady, N. Y. 16-page bulletin GEA-2150B concerns Diactor generator-voltage regulators, Type GDD for direct-current-machines.

123 VOLTAGE REGULATOR—Westinghouse Electric & Mfg Co, East Pittsburgh, Pa. 10-page booklet No. B2165 covers Type SU induction-feeder-voltage regulators. Construction details illustrated, and method of adjustment described.

124 VOLTAGE REGULATORS—General Electric Co, Schenectady, N. Y. GEA-3279 describes Type GDA diactor regulators, for voltage control of ac generators, synchronous condensers, and synchronous motors.

125 RECORDER—General Electric Co, Schenectady, N. Y. GEA-3187A explains principles of Type CF-1 portable inkless strip-chart recorder for survey work, indoor or outdoor service.

126 VOLTAGE REGULATORS—General Electric Co, Schenectady, N. Y. Catalog No. GEA-1577E covers Type MLT-16/32 step-voltage regulators. 20-page booklet gives descriptions of each inside part of the regulator.

127 AMMETER — Columbia Electric Mfg Co, 4519 Hamilton Ave, N E, Cleveland, Ohio. Bulletin, section 400, illustrates and describes line of Tong-Test ammeters. Features, and construction, form part of bulletin, photographs illustrating text.

128 RHEOSTATS—James G Biddle Co, 1211-13 Arch St, Philadelphia, Pa. 4-page bulletin 1620 describes new improvement to Jagabi sliding-contact rheostats, which is graphite lubricator associated with phosphor bronze brushes.

129 VOLTMETER—Bristol Co, Waterbury, Conn. Bulletin 538 covers portable voltmeter designed for outdoor survey work, and made to withstand rough handling.

130 DEMAND METERS — Westinghouse Electric & Mfg Co, East Pittsburgh, Pa. Catalog Section 42-315 describes indicating demand meters, made by combining new registers and special covers with standard watthour meters.

131 SOLENOIDS—Dean W Davis & Co, Inc, 545 W Fulton St, Chicago, Ill. 8-page catalog describes custom-built solenoids, coils and transformers. Graphs give technical information, and illustrations show applications of solenoids.

132 MAGNETIC RELAYS — Roller-Smith Co, 1766 West Market St, Bethlehem, Pa. 8-page catalog No. 12-A illustrates and describes line of Type DT-1 thermo-magnetic relays, used for the protection of ac motors, generators, and transformers.

133 VOLTAGE REGULATOR—Electric Machinery Mfg Co, Minneapolis, Minn. Single-page leaflet No. 158 describes E-M voltage regulator for "package" generator unit. Explains how regulator is applied, and how it works.

134 TESTERS—James G Biddle Co, 1211 Arch St, Philadelphia, Pa. Bulletin 1600 describes six types of instruments that operate on cross-coil "Megger" principle. Color chart included showing "Megger" instruments covering resistance range from 1,000,000th of an ohm to 20,000 megohms.

135 MEGOHMMETER — Herman H Sticht & Co, 27 Park Place, New York, N. Y. Model DM "Megohmer" is described in 4-page bulletin No. 173. How to measure insulation resistance, and dc voltage instruments given.

FANS

136 PRESSURE FANS—B F Sturtevant Co, Hyde Park, Boston, Mass. Illustrated, 2-color catalog No. 444 contains photographs and brief descriptions of complete line of pressure fans, with specifications, hp, volume, and speed.

137 DRAFT FANS—B F Sturtevant Co, Hyde Park, Boston, Mass. Bulletin No. 446 covers vane control for mechanical draft fans. Graphs used to illustrate volume, static pressure, etc.

138 FANS—B F Sturtevant Co, Boston, Mass. Bulletin No. 445 covers draft fans, showing specifications, construction details, and optional equipment.

139 FANS—B F Sturtevant Co, Boston, Mass. Bulletin No. 448 describes draft fans (Design 9) which operate at high speeds required by direct-connected turbine or motor drives.

140 DRAFT FANS—B F Sturtevant Co, Hyde Park, Boston, Mass. Bulletin No. 447 describes steel plate induced-draft fans, presenting each part of fan separately.

FEEDWATER TREATMENT

141 FEEDWATER TREATMENT — Cochrane Corp, 17th & Allegheny Ave, Philadelphia, Pa. Booklet No. 2059 deals with advantages of feedwater treatment of the hot-lime-and-soda type combined with deaeration equipment of the atomizing type to eliminate dissolved oxygen and other corrosive gases.

142 pH INDICATOR—National Technical Laboratories, 3330 E Colorado St, Pasadena, Calif. Bulletin No. 16 on Beckman pH indicator with glass electrode. Short article, "Modern pH Control," lists main advantages of automatic meter.

143 FEEDWATER CONTROL—Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio. 16-page booklet No. 105 shows principle of three-element control of feedwater, description of system, and diagrammatic layout of control. Several air-flow steam-flow charts shown.

GASKETS

144 GASKETS—Goetze Gasket & Packing Co, Inc, New Brunswick, N. J. Single-page leaflet No. 51-A lists standard gaskets for ring joint flanges in Armco iron and 4-6 Chrome Alloy.

145 GASKETS—The Metallo Gasket Co, 10–18 Bethany St, New Brunswick, N. J. 16-page Catalog 40 covers Metallo standard round gaskets, special gaskets, dimensions and list prices.

146 GASKETS—Azor Corp, Federal Trust Bldg, Newark, N. J. Single-page leaflet points out many advantages of Flexiwound gaskets and gives list prices of gaskets from 1⅞ x 2½-in. to 24⅞ x 28⅛-in. size.

147 GASKET MARKER—Crane Packing Co, 1800 Cuyler Ave, Chicago. Marker eliminates dividers and is designed as handy tool for outlining and marking gasket sizes on sheet packing.

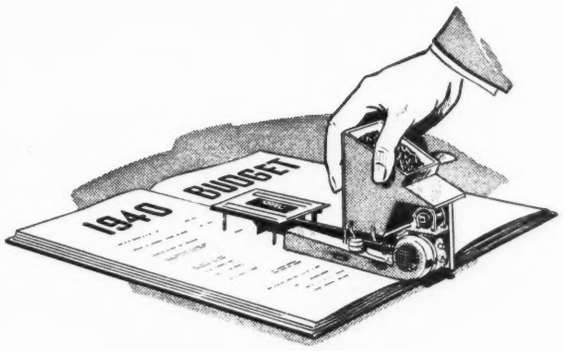
GEARS & PULLEYS

148 GEARING — Westinghouse Electric & Mfg Co, East Pittsburgh, Pa. Characteristics and advantages of heat-treated hardened gears described in 16-page booklet, Technical Data 71,000. Covers Westinghouse-Nuttall method of treatment, control, and quenching, properties of different materials, heat-treatment, and case-hardening.

149 GEARING—D O James Mfg Co, 1120 W Monroe St, Chicago, Ill. "Gears for Modern Industry" is leaflet showing different types of gearing and their application in industry.

150 PULLEYS—Rockwood Mfg Co, Indianapolis, Ind. 16-page bulletin

Put IRON FIREMAN *into your 1940 budget*



What other investment can earn so much for you? Decide now that in 1940 you will *modernize, Iron Fireman-ize* your boiler plant. Iron Fireman will step up operating efficiency to a new high, and at the same time earn an exceptional return on the investment.

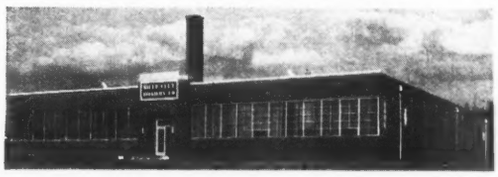
For instance, *Bowser Pump,* Fort Wayne, Ind., is earning a 76% return on its Iron Fireman investment. *Massengill Laboratories,* Bristol, Tenn.-Va., is receiving a 39% annual return; and its 12 Iron Fireman stokers have given 50 years' combined service at a total service cost of only $29.20. *Patterson Mills,* Roanoke Rapids, N. C., is collecting annual cash savings amounting to 87% of its three Iron Fireman Powerams, with steam costs cut from 35 cents to 20.8 cents.

Let us make an Iron Fireman Engineering Survey of your plant. We cannot promise *you* such tremendous savings—unless your situation offers similar opportunities for improvement. But if you will authorize us to make a survey of your steam costs at our own expense, we will give you a conservative report showing what Iron Fireman *can* do. We will work in cooperation with your own engineer, consulting engineer, or fireman. The survey report can be incorporated, if you wish, in your 1940 budget recommendations. Send the coupon, and we will do the rest.

"Iron Fireman cut our fuel budget 20%"

. . . reports John K. Voehringer, Jr., president, Mock, Judson, Voehringer Co.

Greensboro, N. C., mill of Mock, Judson, Voehringer: one of the largest and finest full-fashioned hosiery mills in the South; where three Iron Fireman stokers have operated for 10 years.



New hosiery mill in Siler City, N. C., where a new Iron Fireman *Poweram* underfeed stoker is providing low-cost steam.

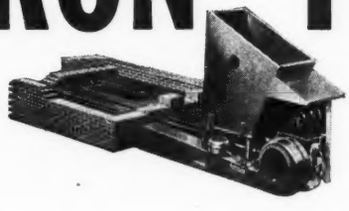
In 1929 the Mock, Judson, Voehringer Company installed three heavy-duty Iron Fireman stokers in its boiler room. These stokers are now entering their second decade of operation—piling up fuel savings compared with hand-firing, at the rate of 20% a year. Maintenance cost on all three stokers combined, over the entire 10 years, has been only $350, reports President Voehringer. He adds that with Iron Fireman firing, "we maintain uniform pressure *regardless* of steam demands for processing work and heating. Boiler room expense has been reduced to a minimum through the use of lower-cost sizes of coal, reduction in tonnage burned, and reduction in labor required."

When the affiliated concern, the Siler City Hosiery Co., erected a new mill recently, a new Iron Fireman *Poweram* was promptly installed . . . making the fourth Iron Fireman heavy-duty stoker operated by Mr. Voehringer.

IRON FIREMAN

THE IRON FIREMAN

Automatic Coal Stokers



IRON FIREMAN MANUFACTURING CO., Portland, Ore.; Cleveland; Toronto.

Mail to 3262 West 106th Street, Cleveland, Ohio.

☐ See us about making an Iron Fireman Engineering Survey of our steam costs.

Send ☐ Industrial Power Catalog
☐ Commercial Heating Catalog.

Name_____

Address_____

No. 860 covers all types of Rockwood paper pulleys, giving complete description of construction and operation.

151 GEARING—Michigan Tool Co, 7171 E McNichols Rd, Detroit, Mich. Booklet entitled, "Hobbing" covers all factors involved in hobbing of gears, splines, etc, and includes formulas and charts.

152 PULLEYS—American Pulley Co, Philadelphia, Pa. Catalog P-39 concerns steel-split pulleys for all transmission service. Describes wheels which can be used for pulley rim speed up to 6000 fpm. Supplement covers Sprucolite motor pulleys, giving list prices.

153 GEARS—De Laval Steam Turbine Co, Trenton, N. J. Varied and numerous applications of worm gears in transmitting power from electric motors, water turbines, etc, to slow- and moderate-speed machinery, is described in booklet entitled, "Worm Gears in Industry". Leaflet E-1175.

154 GEARS—Charles Bond Co, 617-23 Arch St, Philadelphia, Pa. Catalog No. W-59 covers Bond stock gears, sprockets, speed reducers, flexible couplings, and other mechanical-transmission equipment. Included is the recently introduced line of B-type double-reduction speed reducers having ratios as high as 4,000 to 1.

155 GEARMOTORS — Westinghouse Electric & Mfg. Co, E Pittsburgh, Pa. 8-page bulletin No. 3610 describes all types of Westinghouse gearmotors, including common and special types.

156 VARIABLE PULLEY—Speedmaster Co, Div of Continental Machines, Inc, 1301 Washington Ave, S, Minneapolis, Minn. 6-page leaflet presents advantages of variable speed pulley, with illustrations and line drawings of model.

157 UNIVERSAL JOINTS — Mechanics Universal Joint Div, Borg-Warner Corp, Rockford, Ill. 12-page catalog contains descriptions of "Mechanics" universal drive shafts and joints, giving illustrations, applications, specifications.

GENERATORS & ACCESSORIES

158 AIR COOLERS—Griscom-Russell Somerset St, Philadelphia, Pa. 4-N. Y. 8-page bulletin No. 1219 on K-Fin air cooler includes applications for cooling air and hydrogen circulating through generator windings.

159 GENERATORS — Allis-Chalmers Mfg Co, Milwaukee, Wis. 8-page bulletin B6031 contains information concerning bracket-bearing ac generators with direct-connected exciters. Also covers voltage regulators and switchboards for the operation of same.

160 GENERATORS—General Electric Co, Schenectady, N. Y. Bulletin GEA-1960A gives characteristics, features and specifications of low-speed synchronous generators.

161 GENERATOR — Electric Machinery Mfg Co, Minneapolis, Minn. 4-page publication 155 describes "packaged" generator assembly, consisting of exciter, voltage-regulator, generator-voltmeter and ammeter, mounted on generator.

162 GENERATING SETS—Troy Engine & Machine Co, Troy, Pa. 24-page catalog No. 108 shows parts and gives description of Troy-Engberg generating sets, ac or dc.

163 AUTOMATIC SYNCHRONIZER—Electric Machinery Mfg Co, Minneapolis, Minn. No. 157, single-page leaflet explains and illustrates operation of synchronizer, used to bring generator on line in 5 seconds.

HEATERS

164 OIL HEATERS—Griscom-Russell Co, 285 Madison Ave, New York, N. Y. 8-page bulletin 1640 describes storage tank oil heater with fin type heating elements. Also explains advantages of G-fin heat-transfer surfaces.

165 HEATERS—Young Radiator Co, Racine, Wis. 4-page catalog No. 6538 covers type FC heating units for public halls, buildings, auditoriums, etc. Gives various types, with sound levels and capacity tables.

166 DEAERATING HEATERS—Worthington Pump & Machinery Corp, Harrison, N. J. 6-page leaflet W-210-B24 describes vertical double-element-type heater and deaerator.

167 HEATERS—Young Radiator Co, Racine, Wis. 15-page bulletin No. 2738 illustrates Type SH and TH unit heaters. Gives capacity tables, methods of piping, and wiring diagrams.

168 UNIT HEATERS—John J. Nesbitt, Inc, Holmsburg, Pa. 8-page booklet covers Webster-Nesbitt Series F unit heaters, capacities from 22,600 to 101,500 Btu per hr. Ratings for use with hot water also given.

INSULATION

169 INSULATION — Johns-Manville, 22 East 42nd St., New York, N. Y. 14-page booklet describes rock cork in sheets and for pipe insulation.

170 INSULATION — Continental-Diamond Fibre Co, Newark, Delaware. 46-page booklet describes "Dilecto,," a laminated phenolic insulation. Grades and specifications of insulation given, both sheets and tubes, and mechanical properties, strength, and weights of sheets and tubes. Describes other products of company.

171 INSULATION—Quigley Co, 56 W 45th St, New York, N. Y. 8-page booklet No. 327-C-15M describes "Insulag," refractory lagging for temperatures up to 2200 F. Properties, uses and temperature tables given.

171-A INSULATION — Refractory & Insulation Corp, 381 4th Ave, New York, N. Y. Single-page bulletin No. I-65 covers R & I "Twinsul," combination of insulating blanket and insulating block, for use with temperatures up to 1800 F.

LUBRICATING EQUIPMENT

172 CENTRIFUGES — The Sharples Corp, 2336 Westmoreland Ave, Philadelphia, Pa. 20-page Bulletin No. 1225 describes family of centrifugals, called Super-Centrifuges, and illustrates method of operation and result to be expected.

173 LUBRICATION—U. S. Electrical Motors, Inc, Los Angeles, Calif. Three-color bulletin describes U S Lubriflush system of lubrication. Drawings show operation of system.

174 LUBRICATION—Bijur Lubricating Corp, 43-01 22nd St, Long Island City, N. Y. "Automatic Lubrication,—Why?", Booklet J, gives 14 reasons supporting the statement. Also serves as quick reference chart on subject of automatic centralized pressure-lubrication.

175 LUBRICATION—Bowen Products Corp, Auburn, N. Y. 8-page general catalog No. 76 describes electric-automatic lubricating systems. Line drawings show installation of unit, and diagrams illustrate various types of equipment used.

176 LUBRICATION—Sun Oil Co, 1608 Walnut St, Philadelphia, Pa. "Serving Industry", 36-page bulletin, gives short description of equipment, together with illustrations, then provides recommendations of oil to be used to overcome particular friction problems.

177 LUBRICATION—Lubriplate Div, Fiske Bros Refining Co, 129 Lockwood St, Newark, N. J. 16-page folder describes "Lubriplate" lubricant, covering the fluid series, the "100", "200", and "300" series, and applications for general use. Also includes data on plain, ball and roller bearings and gears.

178 OIL—E F Houghton & Co, W Somerset St, Philadelphia, Pa. 4-page folder describes advantages of "STA-PUT" lubricating oils in all industrial applications.

179 DIESEL-ENGINE OILS — E F Houghton and Co, W Somerset St, Philadelphia, Pa. Leaflet No. 2-86 presents advantages of three types of diesel oils, together with results of tests made by the company.

180 OIL RECLAIMER—The Hilliard Corp, Elmira, N. Y. 34-page catalog made up of various bulletins tells story of HILCO oil reclaimer, giving dimension, construction, operation, advantages, and installations.

METALS & ALLOYS

181 METALS AND ALLOYS—American Manganese Steel Div, American Brake Shoe Foundry Co, Chicago Heights, Ill. "The Toughest Steel Known" includes illustrations of various applications in the field, and special alloys for high temperature and corrosion services.

182 METALS AND ALLOYS—International Nickel Co, 67 Wall St, New York, N. Y. 16-page bulletin entitled "Use of Nickel Alloy Cast Irons in Gas Manufacturing Equipment" is paper presented by J S Vanick, before New England Gas Assn.

183 NICKEL ALLOY — International Nickel Co, 67 Wall St, New York, N. Y. 4-page leaflet concerns nickel alloy steels and cast irons used in construction of diesel engines and parts.

184 NICKEL ALLOYS—International Nickel Co, 67 Wall St, New York, N. Y. 6-page leaflet contains basic information on mechanical corrosion resistance, and other properties of rolled nickel, Monel, and other high-nickel alloy.

185 METALS & ALLOYS—International Nickel Co, 67 Wall St, New York, N. Y. 18-page booklet, "Tremendous Trifles" is collection of practical ideas used by electrical-equipment manufacturers for solving problems with small parts of nickel, Monel, etc.

186 COPPER AND STEEL—Copperweld Steel Co, Glassport, Pa. Process of molten-welding copper and steel explained in detail by 8-page colored bulletin. All operations of process systematically described.

187 BRONZE BARS—Johnson Bronze Co, 310 South Mill St, New Castle, Pa. "Hang-me-up" folder lists all sizes of Johnson Universal Bronze bars. Weights of bars also listed.

188 METALS AND ALLOYS—Chase Brass & Copper Co, Waterbury, Conn. 4-page bulletin describes antimonial Admiralty, patented alloy developed for oil-refinery heat-exchanger and condenser tubes.

189 TUBE DATA—Babcock & Wilcox Tube Co, 85 Liberty St, New York, N. Y. Technical bulletin No. 12 contains information and technical data on B&W seamless-alloy tubes and pipe for high-pressure and high-temperature services.

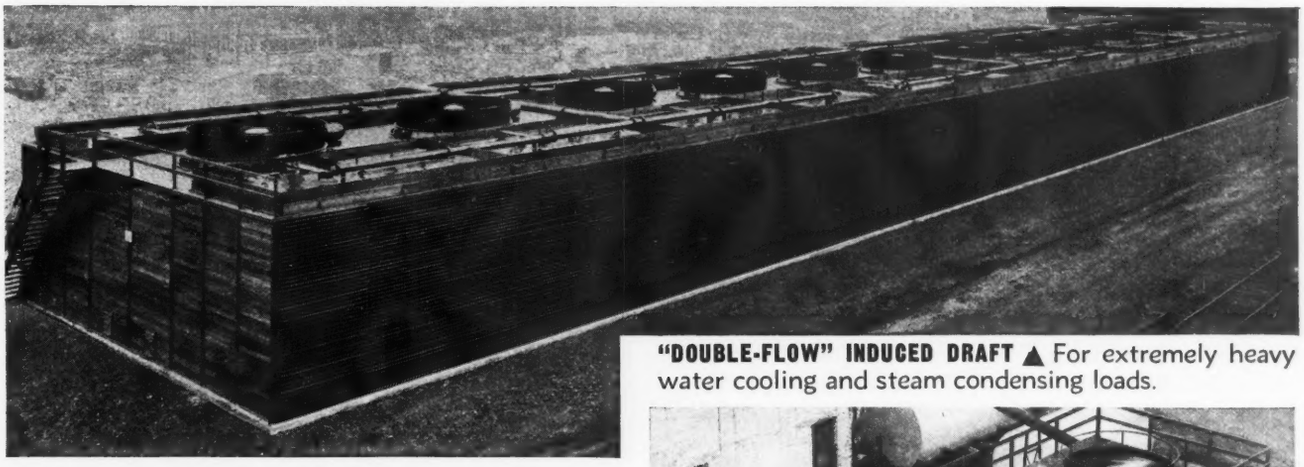
190 IRON AND STEEL PRODUCTS —A M Byers Co, Pittsburgh, Pa. 55-page general catalog, 1939 edition, is designed to meet the needs of the purchasers of wrought iron, tubular and flat-rolled products, and tubular-steel products.

191 STELLITE—Haynes Stellite Co, Kokomo, Ind. General catalog F-4027 presents physical, mechanical, and chemical properties of Haynes Stellite Co alloys, together with brief description.

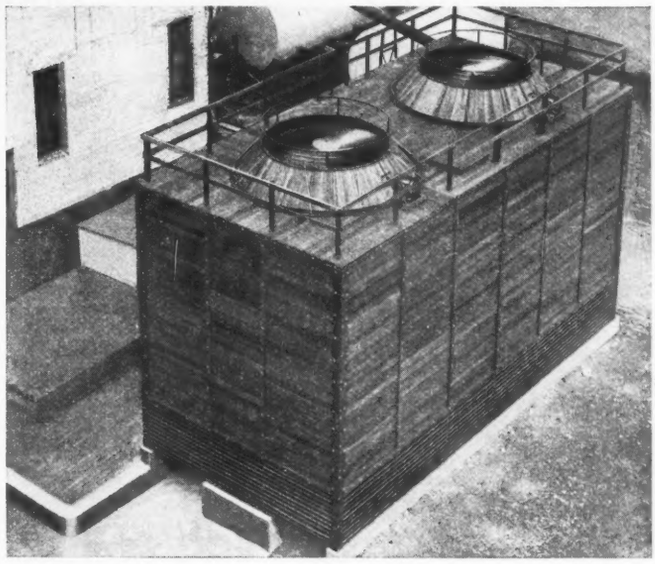
192 CASTINGS—American Manganese Steel Division, Chicago Heights, Ill. 24-page booklet covers entire process of making AMSCO steel castings, from research department to finished product.

193 CASTINGS—Meehanite Research Institute, Pittsburgh, Pa. 8-page booklet, Form 100, entitled "Meehanite—

MARLEY the *Complete* Line of COOLING TOWERS for 1940

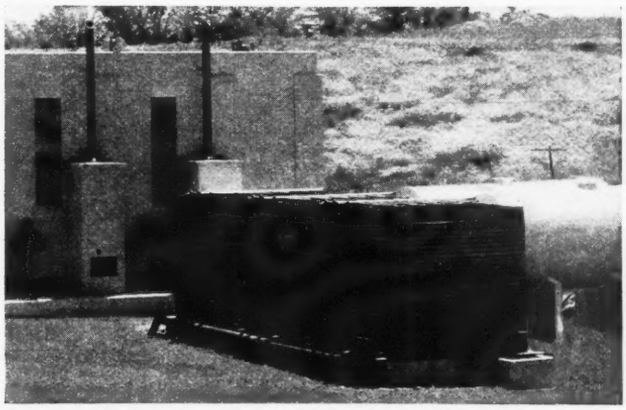


"DOUBLE-FLOW" INDUCED DRAFT ▲ For extremely heavy water cooling and steam condensing loads.



Even Greater Performance and Economy at Less Cost!

Marley engineering has made the cooling tower's advantages and savings available to an almost unlimited range of applications from very small to the largest. Marley's well known structural, mechanical and operating characteristics bring owners unequalled performance, dependability and long life. Yet many models are reduced even from 1939's low prices.

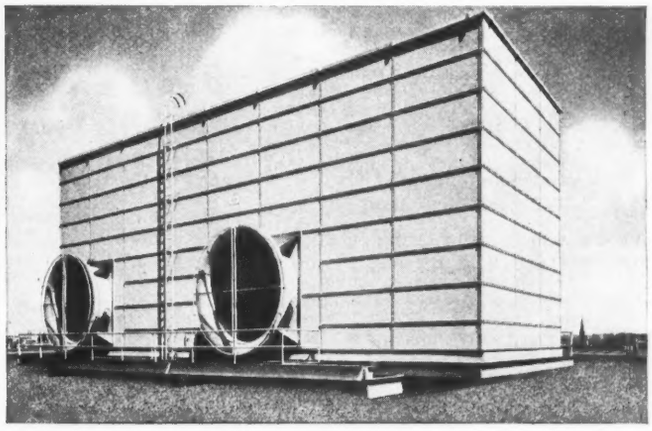


ATMOSPHERIC SPRAY TYPE ▲ For cooling engines, compressors, condensers, etc. Also equipped with coils for closed-system or "indirect" cooling.

also: ATMOSPHERIC DECK TYPE TOWERS for all heavy industrial water cooling services.

and: SPRAY PONDS and all accessories including louvered fence for prevention of wind drift.

"STANDARD" INDUCED DRAFT ▲ and FORCED DRAFT ▼ For any capacity in any kind of service. Either type furnished in Redwood or steel.



Marley *Non-Clog* SPRAY NOZZLES

with Patented Side-Injection

ALL TYPES for Air Washers, Brine Spraying, Atmospheric Condensers, Cooling Towers, Humidifying, Ice-Melting, etc. Many sound reasons why they lead in sales and installed capacity.

THE MARLEY CO., 3001 Fairfax Rd., Kansas City, Kans.
Gentlemen: Send attractive illustrated literature on—

☐ COOLING TOWERS for.....

☐ SPRAY NOZZLES for.....

NAME.....

COMPANY.....

STREET No.....

CITY..... STATE.....

The Metal For Pump Castings" describes and illustrates various adaptations of Meehanite to pumps faced with severe service requirements.

194 NICKEL AND ALLOYS—The International Nickel Co, Inc, 67 Wall St, New York, N. Y. Bulletin T-13, on nickel and nickel-base alloys, rewritten and revised, includes new sections and chapters. Tables and charts.

METERS & INSTRUMENTS

195 GAS METER—Republic Flow Meters Co, 2222 Diversey Parkway, Chicago, Ill. 4-page unit No. 30-39 describes Republic ring-balance-meter, low-pressure gas meter designed to measure blast-furnace gas, coke-oven gas, natural gas, mixed gas and air.

196 TACHOMETER—Herman H Sticht Co, 27 Park Place, New York, N. Y. 4-page bulletin No. 720 describes Standco hand tachometers, made by Jaquet of Switzerland, of the governor type, covering 3 or 4 ranges.

197 CONTROLS—General Controls Co, Glendale, Calif. 36-page catalog pictures and explains construction of all types of thermostats and gas-actuated controls. Dimensions and capacities.

198 THERMOCOUPLES—Foxboro Co, Foxboro, Mass. 36-page bulletin No. 235 is divided into sections describing different kinds of thermocouples, thermocouple assemblies and parts. Methods of installation pictured, and tables with model numbers used throughout.

199 PYROMETER—Leeds & Northrup Co, 4934 Stenton Ave, Philadelphia, Pa. 16-page Catalog N-33D describes new temperature-measuring instrument, first industrial optical pyrometer to apply potentiometer method.

200 FLOWMETERS—Cochrane Corp, 17th & Allegheny Ave, Philadelphia, Pa. 16-page bulletin No. 2094 contains story of operating principles and construction of tilting U-tube meter for measuring flow of steam, gas and fluids.

201 THERMOMETERS — Brown Instrument Co, Wayne & Roberts Aves, Philadelphia, Pa. New line of thermometers, with specially designed cases, subject of 8-page Bulletin 2-17-60. Indicating, recording, 2- and 3-pen recording instruments shown and described.

217 PRESSURE REGULATORS — Chaplin-Fulton Mfg Co, 28 to 40 Penn Ave, Pittsburgh, Pa. 60-page catalog No. 40 covers Fulton pressure regulators for natural and manufactured gas. Directions in use of several regulators presented, together with dimensions and price lists of each model.

218 STEAM - GENERATOR AUTOMATIC CONTROLS — Askania Regulator Co, 1603 S Michigan Ave, Chicago, Ill. Bulletin 110, 11 pages, "Automatic Control For Steam-Generating Units", presents fundamental problems of boiler control with solutions.

219 LEVEL INSERT—Reliance Gauge Column Co, 5902 Carnegie Ave, Cleveland, Ohio. Bulletin No. 391 illustrates new design of Reliance Prismatic Liquid Level Insert, used as replacement for tubular glass on storage equipment and boilers.

220 LEVEL INDICATOR—T W McNeil Engrg Equipment Co, 4057 W Van Buren St, Chicago, Ill. 2-page leaflet shows remote boiler-water level indicator for marine or stationary service.

221 TEMPERATURE CONTROLLERS—Foxboro Co, Foxboro, Mass. 48-page bulletin No. 225 discusses temperature controllers, and outlines types of controllers to meet industrial needs.

222 CONTROLLERS — Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass. 12-page bulletin No. 416 describes liquid-level controllers, covering complete line of direct-connected ball-float controllers. All types illustrated as are accessory lever type valves.

223 INDICATING GAGES — Foxboro Co, Foxboro, Mass. 8-page booklet No. 229 describes functions and advantages of Foxboro gages where pressure is important factor. Cross-sectional drawing of construction of Model P given, together with standard specifications.

224 TEMPERATURE INDICATORS —Leeds & Northrup Co, 4901 Stenton Ave, Philadelphia, Pa. 4-page catalog No. N-33A(5) describes new manually operated indicators for taking temperatures. Units are self-contained with exception of thermocouple leads.

225 DIAL THERMOMETERS—C J Tagliabue Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y. 16-page catalog No. 1170 describes TAG dial-indicating thermometers. Cut-away pictures show construction, tables give specifications.

226 CONDENSATE-PURITY INSTRUMENTS—Leeds and Northrup Co, 4901 Stenton Ave, Philadelphia, Pa. 20-page catalog N-95-163 describes instruments for determining condensate purity in steam plants. In addition, it explains the method of measurement and illustrates typical applications.

227 IGNITION CONTROL — Wheelco Instrument Co, 1929-1933 S Halstead St, Chicago, Ill. 4-page bulletin No. A-1105 describes new "Photo-head" which controls ignition of flame by photoelectric cell.

228 THERMOMETERS — Bristol Co, Waterbury, Conn. Bulletin 529 describes strip-chart resistance thermometer, which can make up to 8 temperature records simultaneously on one chart.

229 PRESSURE REGULATORS — Foster Engineering Co, 109 Munroe St, Newark, N. J. Catalogue 70, Bulletin 5, of 10 pages, covers Foster U-Type pressure-reducing regulators for air, water, and other gases and liquids. Describes each of five types covering a wide range of services.

230 PRESSURE REGULATORS — Grove Regulator Co, 1729 Poplar St, Oakland, Cal. 21-page bulletin No. 123 covers the only regulator said to meet the U. S. Navy specifications for every pressure. Gives details of regulator, together with instructions for installation.

231 TEMPERATURE GAGES—Weston Electrical Instrument Corp, Newark, N. J. 12-page circular on temperature gages for industrial and laboratory use.

232 METERING, CONTROLLING, AND PROPORTIONING — Proportioneers, Inc. 7 Codding St, Providence, R. I. 19-page booklet No. TOU-3 describes the following: Adjust-o-feeder, Treet-o-unit, Vol-u-meter, Decanter, Sampl-o-meter, and loss-in-weight proportioneer.

MOTORS

233 MOTORS — Allis-Chalmers Mfg Co, Milwaukee, Wis. 8-page bulletin B-6010 is price list of squirrel-cage and induction motors. Short descriptions and photographs of several models given.

234 MOTORS—General Electric Co, Schenectady, N. Y. Bulletin GEA-98B covers type RB single-phase, repulsing, brush-shifting motors, available with speed controllers for direct or remote operation.

235 MOTORS—General Electric Co, Schenectady, N. Y. GEA-1698A contains information on construction features of general-purpose, constant, adjustable and varying speed, wound-rotor induction motors.

236 MOTORS—General Electric Co, Schenectady, N. Y. GEA-1807B describes squirrel-cage induction motors, frame 542 to 579, Types KT, FT, and FTR.

249 ELECTRIC MOTOR STANDARDS —Louis Allis Co, Milwaukee, Wis. 8-page booklet No. 610 covers main NEMA standards and definitions. Contains suggestions for proper selection of motors, types of drives, types of protected motors and definitions.

250 INDUCTION MOTORS — Allis-Chalmers Mfg Co, Milwaukee, Wis. Bulletin No. 1196 explains construction and operation of squirrel-cage induction motors.

251 MOTORS—Crocker-Wheeler Electric Mfg Co, Ampere, N. J. Bulletin 251-A covers ac polyspeed motors, giving speed, range, construction, efficiency, and applications. New information includes description of various types of regulators available for manual, remote, and automatic speed-control.

252 MOTOR REPAIRS—Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill. 84-page catalog describes equipment for motor maintenance, commutator - cleaners, variable - speed transmissions, factory production materials, electric soldering tools, etc.

253 MOTORS—Diehl Mfg Co, Elizabethport, N. J. 25-page catalog No. 39 contains price information and application data on motors, generators, motor-generator sets, ventilating equipment, grinders, etc.

254 SYNCHRONOUS MOTORS — Westinghouse Electric & Mfg Co, E Pittsburgh, Pa. 12-page illustrated booklet No. B-2164 describes and explains simple facts about synchronous motors. Application data, including more important motor use and typical torque requirements are given.

255 MOTORS—Allis-Chalmers Mfg Co, Milwaukee, Wis. 16-page booklet No. 1196 shows applications of Lo-Maintenance motors and progress made in applying motors to machine tools.

256 MOTORS—I-T-E Circuit Breaker Co, Philadelphia, Pa. "Keeping Ac Motors in Operation," illustrates and describes Thermo - Magnetic – Overload which provides ac motors with complete overload and short circuit protection.

PACKING

257 PACKINGS—Greene, Tweed & Co, 101 Park Ave, New York, N. Y. 16-page bulletin contains data on lubricated packing. Various types described, together with packing recommendations, labor cost, testing and standardization of packing.

258 PACKINGS—Sea-Ro Packing Co, 75 West St, New York, N. Y. Spiral-bound catalog contains, in addition to descriptions of gaskets and packing, tables showing circumference, diameter and area of circles, decimal equivalents, Centrigrade-Fahrenheit conversion table, metric conversion table, etc.

259 PACKING—Eureka Packing Co, Braiding & Packing Works of America, Inc, 250–252 46th St, Brooklyn, N. Y. 36-page catalog No. 22 describes all types of packing, including packing in coil, spiral and ring form.

260 LEATHER-PACKING—Alexander Bros, 406 N 3rd St, Philadelphia, Pa. 32-page pocket size handbook. Form A-49, gives leather packings for every industrial purpose.

261 PACKING—Rodpak Mfg Co, 1161 Folsom St, San Francisco, Calif. 4-page booklet describes metallic packing for reciprocating and centrifugal units.

PAINTS & COATINGS

262 PAINTS—American Asphalt Paint Co, 43 East Ohio St, Chicago, Ill. How to obtain maximum results in painting interior and exterior surfaces on all types of tanks and supporting structures is explained in folder.

263 PAINTS—B F Goodrich Co, Akron, Ohio. 4-page catalog section on line of Acidseal paints derived from rubber contains actual reproduction of different colors.

264 PLASTIC COMPOUND—National Engrg Products Inc, 4100 Georgia

NEW CATALOGS, BOOKLETS, BULLETINS

Bring Your Equipment Library up to Date

For Your Convenience

Three business-reply cards are printed here as a part of this insert. On each is room for you to request four pieces of literature.

How to Order

1. If you are requesting four pieces or less, please use only the bottom card. Likewise, for four to eight pieces, use the bottom two cards, and for eight to twelve pieces, use all three cards.

2. Be sure to fill one of the twelve spaces for each piece you order. This will assure your receiving copies of literature promptly by reducing amount of clerical work in handling your requests.

3. When you have filled out one space for each catalog or bulletin you want, detach along the scored lines and drop the cards in the mail. No postage is required.

Example

Write in circle number of item describing one catalog wanted → (26)

Name JOHN A. BROWN

Address 110 W. 70TH STREET

NEW YORK, N.Y.

Company WM. DOE MFG. CO. Title ENGINEER

Important

Be sure that the number you write in a circle corresponds with the number of the item describing the piece of literature requested.

Please letter or write plainly and include full address.

These cards not good after March 1, 1940.

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Write in circle number of item describing one catalog wanted → ( )

Name.....

Address.....

.....

Company..... Title.....

Ave, Washington, D. C. 12-page bulletin covers Copaltite, plastic seal used by U.S. Navy Dept. Uses of compound listed, prices given. Also describes Battleship joint seal, Rustnil metal preservative coating, Nabico joint seal, Tempseal cement, Rodpax, metallic plastic packing, pressure equalizers and distributor blow-off system.

265 HEAT-RESISTING COATINGS—Thurmalox Co, 3109 N Broad St, Philadelphia, Pa. 4-page folder describes Thur-ma-lox products, coatings for metal said to be heat resistant up to 1800 F, without discoloration, cracking, or peeling.

PIPE & FITTINGS

266 WELDED FITTINGS — Taylor Forge & Pipe Works, 50 Church St, New York, N. Y. 4-page leaflet No. 392 describes "Centring" WeldELLS, showing actual pipe welding, using units.

267 PIPE-THREADING EQUIPMENT—Oster Mfg Co, Cleveland, Ohio. Catalog 39-A not only presents Oster-Williams Threading Tools, but contains time studies, threading speeds, specifications and other information.

268 STEAM TRAP—W H Nicholson & Co, Wilkes-Barre, Pa. 8-page booklet No. 439 illustrates and describes industrial steam trap. Outstanding and optional features listed.

275 EXPANSION JOINTS—The Foster Wheeler Corp, 165 Broadway, New York, N. Y. 4-page illustrated folder No. X-39-5 describes the Type "S" steel-bellows expansion joints. Drawings show steel flanges, bellows, etc.

276 PIPE-CUTTING AND THREADING—Curtis & Curtis Co, Garden St, Bridgeport, Conn. 12-page booklet on various types of pipe cutting and threading machines gives features, advantages, and specifications, with photographs of cutting operations.

277 FITTINGS—Water Service Laboratories, Inc, 423 W 126th St, New York, N. Y. Single-page leaflet discusses cause of leaky valves, faucets, fixtures, and gives remedy.

278 COUPLINGS—Raybould Coupling Co, Meadville, Pa. 12-page bulletin No. M-700 gives specifications, types, installation method of the Raybould pipe coupling.

281 FLOATS—W H Nicholson & Co, 12 Oregon St, Wilkes-Barre, Pa. 4-page leaflet No. 339 describes chromium plated- and stainless-steel welded floats, from 2½ to 14 in. in diameter, made for all steam pressures up to 1500 lbs., and hydrostatic pressures up to 2500 lbs.

282 PIPE UNITS—The Ric-wiL Co, Union Commerce Bldg, Cleveland, Ohio. Bulletin A-3907 shows detailed construction of pre-fabricated, pre-sealed, insulated pipe units. Both single and multiple pipe units shown.

283 FLEXIBLE TUBING—American Brass Co, American Metal Hose Branch, Waterbury, Conn. Bulletin SS-25 describes line of seamless flexible tubing. Contains discussions on proper use of tubing for carrying steam, liquids, gases, for controlling vibration, and for correcting misaligned and moving parts, etc.

284 UNDERGROUND CONDUIT—The Ric-wiL Co, Union Trust Bldg, Cleveland, Ohio. 4-page bulletin covers Type F conduit for underground steam lines, explaining construction features, and showing methods of installation.

PUMPS

285 PUMPS — Peerless Pump Div, Food Machinery Corp, 301 W Ave 26, Los Angeles, Calif. Bulletin 139-A describes improved-type of water-lubricated pump. Shows cross-section of entire pump, revealing flow of water through bowls and method of sealing impellers by double seal.

286 PUMPS—Decatur Pump Co, Decatur, Ill. Bulletin No. 115A, 12-pages, covers series A-AC-AY-AC-Y self-priming super-turbines and straight self-priming centrifugals for semi-industrial applications, with price list.

287 PUMPS — Granberg Equipment, Inc, 4068 Holden St, Oakland, Calif. Granco parallel dual automatic pumping unit described in bulletin A-4-39.

288 PUMPS — Granberg Equipment, Inc, 4068 Holden St, Oakland, Calif. Model DDN-1½-in. is covered in bulletin A-5-39. Dimensions and specifications included.

299 PUMPS—Worthington Pump & Machinery Co, Harrison, N. J. Booklet W-111-B6C, 6 pages, covers HiVol piston pumps, with specifications, sectional drawing, and table of sizes available.

300 ROTARY PUMPS—Viking Pump Co, Cedar Falls, Iowa. 48-page

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 64, SEC. 510 P. L. & R. NEW YORK, N. Y.

POWER

330 West 42nd Street

New York, N. Y.

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 64, SEC. 510 P. L. & R. NEW YORK, N. Y.

POWER

330 West 42nd Street

New York, N. Y.

Postage Will Be Paid by Addressee

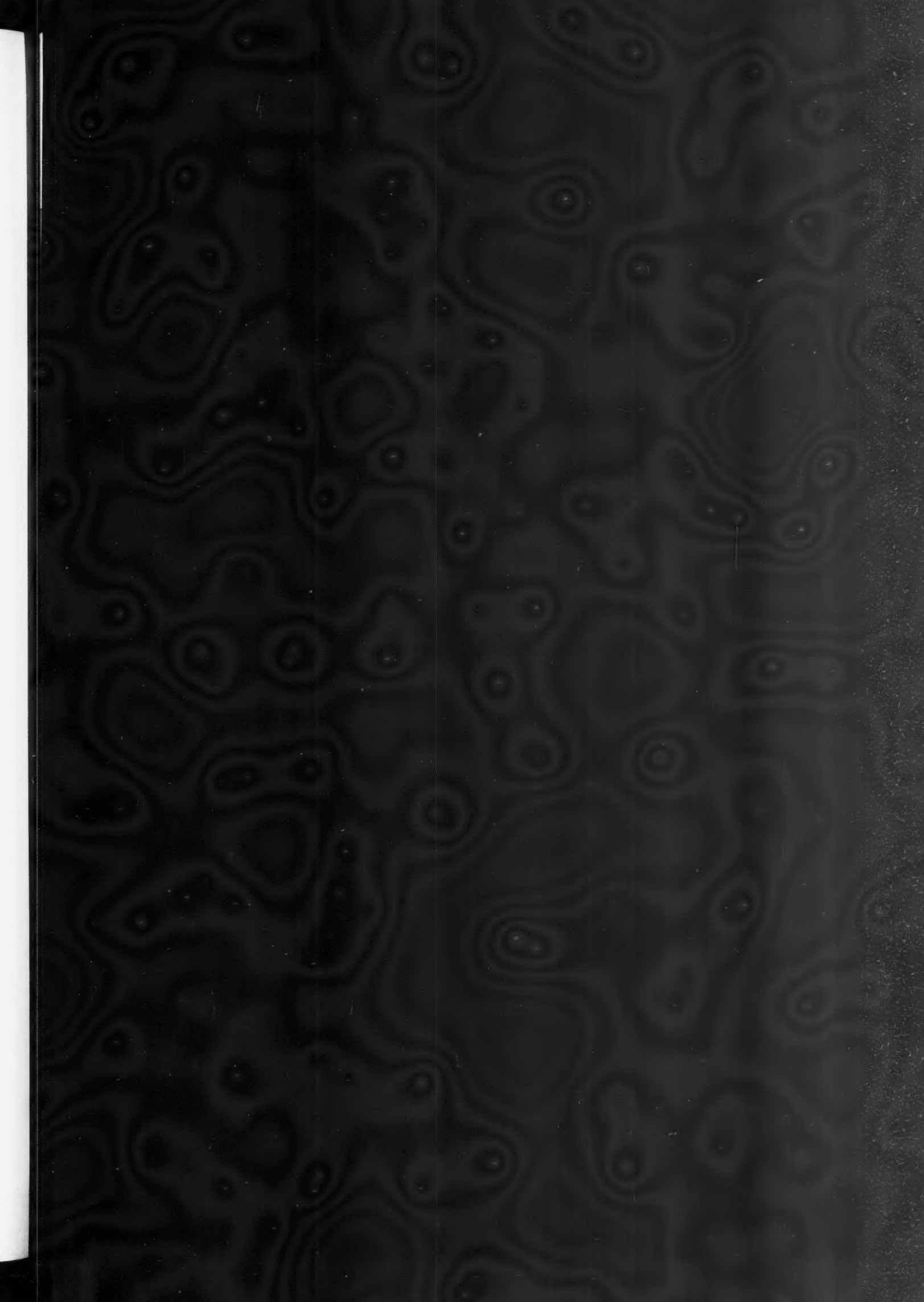
No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 64, SEC. 510 P. L. & R. NEW YORK, N. Y.

POWER

330 West 42nd Street

New York, N. Y.



YOU CAN DEPEND ON J&L SEAMLESS PIPE TO CARRY PRESSURE LOADS SAFELY AND EFFICIENTLY — AND TO GIVE YOU LOW MAINTENANCE COSTS • • •

By specifying J&L Seamless for power piping, engineers and maintenance men throughout the country have endorsed it for strength, safety and dependability. Every length of J&L Seamless is rolled from a solid billet of "controlled quality" steel. There are no welds, therefore no chance of failure at or near a weld.

Scientific control of all J&L finishing operations assures uniform wall thickness, concentricity and the right ductility for easy bending and upsetting. Therefore when J&L Seamless is specified, the manufacture of joints and the installation of the pipe move along smoothly and efficiently. In hundreds of plants J&L piping is giving completely satisfactory service. Specify J&L Seamless for your power piping jobs. In the meantime, get helpful information on piping applications by writing for our Handbook SP-4.

J & L—PILOTS THE COURSE OF CONTROLLED QUALITY IN STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

J&L STEEL

J & L—PARTNER IN PROGRESS TO AMERICAN INDUSTRY

Catalog 39-G gives complete technical information on Viking pump line, including installation data, specification tables, drive data, etc.

301 PUMPS—Economy Pumps, Inc, Hamilton, Ohio. Catalog of engineering data and prices contains 233 pages, paper-bound, with illustrations, graphs and charts.

302 PUMPS—Aldrich Pump Co, Allentown, Pa. 8-page bulletin, Data 65, describes in detail Aldrich-Groff "Powr-Savr" controllable capacity pumps, which through controlling length of pump stroke, controls rate of delivery. Specifications of pump given.

303 CHEMICAL PUMPS AND PROPORTIONERS—Milton Roy, 2031 Madison St, Philadelphia, Pa. Bulletin No. 938 describes and illustrates several improved models of single and multiple unit motor pumps for pumping any type of chemical in exactly desired volume and pressure ranging from 0 to 15,000 lb.

304 BOILER-FEED PUMP — Pacific Pump Works, Huntington Park, Calif. 22-page bulletin No. 74 describes Pacific high-pressure boiler-feed pumps. Illustrates design conditions, features, and specifications of pumps for boiler-feed service, giving characteristic curves.

305 PUMPS—Pomona Pump Co, Pomona, Calif. 8-page bulletin No. 30 describes "Little Chief" pumps, designed to fill pumping needs between domestic supply systems and deepwell turbine pumps. Standard Pomona features incorporated in smaller pump.

306 PUMPS—Pneumatic Tool Co, 6 E 44th St, New York, N. Y. S. P. 1996 describes horizontal-duplex dry-vacuum pumps, their construction, types of drive, and uses.

307 PUMPS—De Laval Steam Turbine Co, Trenton, N. J. 8-page leaflet No. E-1172, a reprint from article by H B Hall, chief engineer of Washington Suburban Sanitary District, describes low lift pumping station of Robert B Morse Water Works at Burnt Mills, Md.

308 PUMPS—John H McGowan Co, Cincinnati, Ohio. 32-page bulletin No. 1 describes steam, power, displacement, centrifugal, deepwell, and rotary pumps, including photographs of each type.

309 PUMPS—Worthington Pump & Machinery Co, Harrison, N. J. Bulletin W-321-M3A illustrates "Jetflo" Deep-well pumps for low-cost water supply systems.

310 OIL-PUMPS—De Laval Steam Turbine Co, Trenton, N. J. 8-page catalog No. L-31 describes rotary displacement pumps for handling fuel and crude oils, lubricating oils, and hydraulic oil.

311 ROTARY PUMPS—Geo D Roper Corp, Rockford, Ill. Bulletin No. R-511, 12 pages, covers rotary pumps for hydraulic power transmission and general purpose.

312 PUMPS—Viking Pump Co, Cedar Falls, Iowa. Bulletin 303 presents hydraulic oil pumps of pressures up to 500 lb. Also includes large rotary and hydraulic units. Charts plot capacity and efficiency curves.

312-A BOILER-FEED PUMP — The Johnson Corp, Three Rivers, Mich. 20-page catalog describes Johnson pressure-equalizing boiler-feed pump, high-temperature condensate-return system, vacuum-action condensate-return system, pump-control method of water-level regulation, and multiple boiler installations of feed pumps.

REFRACTORIES

313 ARCHES — Frazier-Simplex, Inc, 453 East Beau St, Washington, Pa. 16-page catalog describes in detail design of Interlocking tile, hanger, and method of suspension which forms suspended arches, nose constructions, and supported walls.

314 REFRACTORIES — General Refractories Co, Philadelphia, Pa. Book on basic refractories contains data on processes, application, use and construction. Has 32 illustrations and covers entire field of basic refractory service.

315 REFRACTORIES — Norton Co, Worcester, Mass. Bulletin No. 9 presents 4 outstanding features of Crystolon brick, and gives other applications of the brick.

316 REFRACTORY CEMENT — Botfield Refractories Co, Swanson & Clymer Sts, Philadelphia, Pa. 4-page leaflet describes Adachrome, dry type cement.

317 REFRACTORIES—A P Green Fire Brick Co, Mexico, Mo. 8-page booklet P-11 describes "First Quality", "Mexko", "KX-99", "Mizzou", and "Kruzite" firebrick, with story of vitrification.

318 WALL & ARCHES — Furnace Economy Co, 201 N Wells St, Chicago, Ill. 8-page section, part of catalog No. 37 describes Type "E" and "F" furnace wall and arches for boilers. Off-set joints, bonding and replacement covered.

319 WALLS & ARCHES — Geo P Reintjes Co, 2517-19 Jefferson St, Kansas City, Mo. 4-page booklet, "Why Solid Walls are Coming Down", tells the story of cost of maintaining solid walls and advantages of supported walls.

320 REFRACTORIES — Botfield Refractories Co, Swanson & Clymer Sts, Philadelphia, Pa. 4-page bulletin is concerned with ADAPATCH and super-Adapatch refractories for forming many types of monolithic constructions.

321 UNIT-SUSPENDED WALLS AND ARCHES — Bigelow-Liptak Corp, Detroit, Mich. 18-page booklet contains the engineering story of Bigelow-Liptak unit-suspended walls.

322 FIRE BRICK—Ironton Fire Brick Co, Ironton, Ohio. 4-page leaflet points out advantages and applications of Peerless fire brick.

323 FIRE BRICK—Ironton Fire Brick Co, Ironton, Ohio. 4-page leaflet illustrates and describes "Nojoint" plastic fire brick. Directions for use in several applications given.

324 BONDING MORTARS—American Refractories Institute, Specialty Div, Pittsburgh, Pa. Circular No. 1, 8 pages, presents advantages of high-temperature bonding mortars, and increased service that can be expected of refractories laid with it. Types of mortar available, essential qualities, and factors to consider.

325 REFRACTORIES — Harbison-Walker Refractories Co, Pittsburgh, Pa. Single-page leaflet describes boiler refractories made from southern raw materials. Descriptions of brick given, with uses and method of construction.

326 REFRACTORY — Laclede-Christy Clay Products Co, St. Louis, Mo. 4-page booklet shows "before" and "after" pictures giving the use of "Furnascote" in boiler repair and maintenance.

REFRIGERATION EQUIPMENT

327 REFRIGERATING COMPRESSORS—Worthington Pump & Machinery Corp, Harrison, N. J. Bulletin C-1100-B2 covers horizontal duplex-type, single and 2-stage compressors.

328 LEAK DETECTORS — Pennsylvania Salt Mfg Co, 1000 Widener Bldg, Philadelphia, Pa. Card of 6 "Quaker" anhydrous ammonia leak-detectors, for all weak or suspected connections. Sulphur flame indicates leak by forming white foam at leak point.

329 REFRIGERANT GAS PURGER —Armstrong Machine Works, Three Rivers, Michigan. 4-page booklet, Form No. 120-5-239-2, covers refrigerant purgers for automatic air-purging service on compression systems, and for combination purging and expansion valve service.

330 REFRIGERATING COMPRESSOR—Carbondale Div, Worthington Pump & Machinery Corp, Harrison, N. J. 6-page bulletin No. C-1100-B5 describes vertical-duplex, double-acting compressor with enclosed crankcase.

STRAINERS

331 STRAINER—H A Brassert & Co, 310 S Michigan Ave, Chicago, Ill. 4-page folder gives construction and operation of automatic strainer which continuously and automatically removes suspended solids from liquids and cleans itself.

332 STRAINER HEADS — Permutit Co, 330 West 42nd St, New York, N. Y. Leaflet No. 2217 describes expansible strainer heads for filter and softener-pipe underdrain systems.

333 AUTOMATIC SELF-CLEANING STRAINER — The Blackburn-Smith Mfg Co, 310 12th St, Hoboken, N. J. 4-page booklet describes and illustrates the automatic strainer, pointing out the various advantages of operation, construction and service.

SPEED REDUCERS

334 REDUCERS — The Marley Co, Fairfax & Marley Roads, Kansas City, Kan. 4-page leaflet No. 801 describes manufacture of Marley "Geareducers". Also gives service policy and guarantee in regard to construction of reducers.

335 SPEED CHANGERS—Allis-Chalmers Mfg Co, Milwaukee, Wis. Bulletin B6013 covers Vari-pitch speed changers, addition to line of vari-pitch sheaves. Speed control is by handwheel.

336 VARI-PITCH SHEAVES — Allis-Chalmers Mfg Co, Milwaukee, Wis. 16-page bulletin, No. 1261-B illustrates and describes vari-pitch sheaves for changes of speed, showing stationary-control type, for occasional speed changes, and motion control type, where frequent changes are necessary.

337 POWER TRANSMISSION—Morse Chain Co, Ithaca, N. Y. 12-page bulletin 75 covers Morse Round Pin Roller, Silent Chain, Kelpo Free-Wheeling Clutch, High-Torque Indexing and Free-Wheeling Clutch, Pullmore Clutch, and line of Morse Flexible Couplings and Universal Drives.

338 SPEED CONTROL — Allis-Chalmers Mfg Co, Milwaukee, Wis. 7-page booklet No. 1151-B on the Rossman system of adjustable speed control goes into the operating principle of this system, which controls speed of specially designed ac-driven machines over wide speed ranges at high efficiencies.

339 VARIABLE-SPEED TRANSMISSION—Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill. 4-page bulletin, Form SOS 239, describes and illustrates "Select-O-Speed" transmissions, covering all sizes, with hand lever and wheel control.

340 GEARED DRIVES — Westinghouse Electric & Mfg Co, E Pittsburgh, Pa. 36-page booklet No. B-2159 covers uses, adaptations, and developments of all types of geared drives. Booklet gives special emphasis to quarry, textile, pulp and paper, coal, steel, and petroleum industries.

341 SPEED REDUCERS — Stephens-Adamson Mfg Co, Aurora, Ill. 8-page catalog No. 7838 shows typical applications of "SACO" speed reducers. Detailed descriptions of bearings, shafts, etc, given, together with advantages of use.

342 SPEED REDUCERS — Stephens-Adamson Mfg Co, Aurora, Ill.

Exide
BATTERIES
FOR CRANKING
DIESEL ENGINES

A few ticks of the second hand can set a Diesel engine running

An ice-cold Diesel engine with congealed oil in the crankcase... touch a button, the starter whirls and the engine leaps to life. That's the way an Exide Battery handles this tough cranking job. Exides are built for such work, as thousands of operators of Diesel-powered equipment are finding out anew every day.

High voltage for good cranking speeds, plenty of reserve power for cold starts, endurance and dependability to match . . . these are what you get in an Exide, because they are engineered into the battery.

There is a line of Exides especially adapted for the needs of high-speed Diesel engines. There are also Exides for heavy equipment . . . in fact no job is too tough for an Exide. Why not write us today?

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Catalog 7838 gives construction of SACO reducers, and lists advantages in operation. Charts give horsepower rating, input and output speeds.

343 VARIABLE-SPEED CONTROLS —Columbia Vari-Speed Co, Liberty Bldg, Wheaton, Ill. 8-page catalog describes JFS-Jr controls, with typical applications, features, and construction.

344 SPEED REDUCERS — Thomas Prosser and Son, New York, N. Y. 30-page bound booklet describes "Radicon Reducers," engineered by David Brown & Sons of England. Covers all types of reducers, with illustrations.

345 SPEED REDUCERS — Westinghouse Electric & Mfg Co, E Pittsburgh, Pa. 12-page descriptive-data folder No. 3620 covers types SH and DH speed reducers. Type SH is single-reduction unit, with 13 standard ratios ranging from 2.82:1 to 9.5:1. Type DH is double-reduction unit, with 15 standard ratios ranging from 11.8:1 to 70.5:1. Booklet gives application, features, construction, ratings, and illustrations of both types.

346 TEXROPE DRIVES—Allis-Chalmers Mfg Co, Milwaukee, Wis. "Born in a Textile Mill" gives history of Texrope drives, showing "before and after" illustrations. Includes descriptions of motors and vari-pitch sheaves.

STOKERS

347 STOKER—Iron Fireman Mfg Co, Cleveland, Ohio. 4-page folder Form 521 describes Series 52 pneumatic spreader stoker, covering capacities, features, general dimensions, and showing plan and elevation view.

348 STOKERS — Johnston and Jennings Co, 877 Addison Rd, Cleveland, Ohio. 20-page catalog No. 11 describes Stowe stokers, covering their design, operation and efficiency. Compares chain-grate with multiple retort underfeed operation.

349 STOKERS—Perfection Grate and Stoker Co, 4 Fisk Ave, Springfield, Mass. 4-page booklet describes the Perfection Jr underfeed stoker, with illustrations and diagrams. All parts in stoker coming in contact with heat are self-contained, making replacements an easier problem.

350 STOKERS — Westinghouse Electric & Mfg Co, Stoker Dept, Phila, Pa. 20-page bulletin No. B-2170 describes single- and multiple-retort stokers for boilers rated from 100 to 500 bhp single retort, and from 300 rated bhp up, multiple-retort. "Link-grate" design explained in detail, numerous installations pictured, and general operation of both single- and multiple-retort stokers described.

351 STOKERS—Combustioneer Div of Steel Products Engrg Co, Springfield, Ohio. 16-page catalog describes all types of stokers built by company, giving construction features of each and illustrates method of installation. Includes description of automatic air adjuster, small type stoker, heavy duty, bin-feed heavy-duty, and domestic models and the ram-feed stoker.

352 STOKERS—The Detroit Stoker Co, Monroe, Mich. Well-illustrated booklet No. 130 covers Type MC multiple-retort stokers. Efficiency tables are given as well as actual locations of stokers in operation.

353 STOKERS — Combustioneer Division, Steel Products Engineering Co, Springfield, Ohio. 15-page booklet describes the construction, features, and advantages of the Combustioneer stoker. Includes numerous control devices, and other types of ram-feed stokers.

SWITCHES & CIRCUIT BREAKERS

354 SWITCHES—General Electric Co, Schenectady, N. Y. Bulletin GEA-821G concerns CR2927 diaphragm-type pressure and vacuum switches.

375 CIRCUIT BREAKER — Roller-Smith Co, 1766 W Market St, Bethlehem, Pa. Catalog 6-c covers hand-operated mechanisms and attachments and typical mounting arrangements for "Turblator" oil circuit breakers. Technical data brought up-to-date.

376 SWITCHBOARDS—Westinghouse Electric & Mfg Co, East Pittsburgh, Pa. Small-plant and industrial ac switchboards, with knife-switches and fuses, are described in 12-page leaflet No. 31-133. Applications of switchboards, and construction of panels given, and tables present optional equipment and specifications.

TURBINES

381 STEAM TURBINES — Westinghouse Electric & Mfg Co, East Pittsburgh, Pa. 48-page booklet 7-N-20 covers 7 principal types of turbines in sizes up to 10,000 kw, with charts and diagrams. Cross-sectional views, illustrations, show typical installations in representative industrial plants.

382 TURBINES — Elliott Co, Jeannette, Pa. 4-page Bulletin No. H-11 covers Elliott Type CY turbine for mechanical drive. Reproduces photographs of turbine exteriors and interiors, showing inside construction, sections of turbine, overspeed governor, strainer, and governor valve. Complete specifications given.

383 TURBINE-GENERATORS — Turbolite, Inc, Houston, Texas. 4-page leaflet covers type MG Turbolite equipped with General Electric generator. Gives advantages of "Two-unit" construction, and description of model mentioned.

384 TURBINES—Westinghouse Electric & Mfg Co, Philadelphia, Pa. 22-page Booklet B-2175 describes Type-M Turbine, ranging from 100 to 2000 hp, for steam pressures to 650 lb, steam temperatures to 750 F, exhaust pressures to 200 lb, vacuum to 29 in., and extraction pressures to 200 lb. Has large photographs, cross-sectional drawings, and dimensional drawings of the various models.

385 STEAM TURBINES—The Terry Steam Turbine Co, Hartford, Conn. 8-page bulletin S-127 covers application of steam turbines in oil refineries. Consists of address by S O Maxwell, Terry Steam Turbine Co, at Refinery Engrg Conference, Oil World Exposition, Houston, Tex.

386 STEAM TURBINE—De Laval Steam Turbine Co, Trenton, N. J. Reprint of POWER article, "Turbine with Two Lives", by W D Dunbar, describes steam turbine installed to work at low pressure until additional high-pressure boiler is installed, then to operate at higher pressure.

TOOLS

387 TOOL HOLDERS — Armstrong Bros Tool Co, 317 N Francisco Ave, Chicago, Ill. General Catalog No. C-39 describes Armstrong Tool holders; carbon, chrome-vanadium, and detachable head socket wrenches; "C" clamps; lathe and milling machine dogs; turret lathe and screw machine tools, ratchet drills; bits, blades and high-speed steel; setting-up tools; machine shop specialties, and pipe tools.

388 PIPE TOOLS—Beaver Pipe Tools, 371 Dana Ave, Warren, Ohio, Bulletin B covers Model C power unit to convert hand tools into portable electric pipe and bolt machine.

389 PIPE TOOLS—Beaver Pipe Tools, 371 Dana Ave, Warren, Ohio, Bulletin A describes Beaver Model A portable pipe and bolt machine with automatic oiling, universal motor and automatic chuck wrench ejector.

390 TOOLS—George Scherr Co, 128 Lafayette St, New York, N. Y. General catalog includes complete line of machine tools, instruments, and machinery of company. Descriptions included of vernier calipers, relieving lathes, speed indicators, jig-borers, bore inspection telescope, and sine bar level protractor.

391 PORTABLE TOOLS — Black & Decker Mfg Co, Towson, Md. "Proper Care and Maintenance of Portable Electric Tools" gives hints, not only on care and maintenance, but methods of properly grounding to protect operator, currents, proper sizes of extension cables and pointers on what to look for when tool won't work.

VALVES

393 VALVE CONTROL—Permutit Co, 330 West 42nd St, New York, N. Y. Bulletin No. 2153 covers multiport valve control for pressure filters and softeners.

406 VALVES—Homestead Valve Mfg Co, Coraopolis, Pa. 6-page folder illustrates and describes Homestead-Ross air shut-off valves, listing advantages and principle of operation. Pictures show applications, showing how to tell whether valve is open or shut by position of handle.

407 VALVES—Automatic Switch Co, New York, N. Y. 56-page bound catalog on Asco solenoid valves for steam, gas, liquids, and air. Contains new bulletins, which describe newer types of solenoid valve, prices, etc. Includes discount sheet and complete index to all bulletins.

408 SOLENOID VALVES—Davis Regulator Co, 2541 S Washtenaw Ave, Chicago, Ill. 15-page Bulletin S1 diagrams and explains several types of solenoid valves, including those for viscous liquids, steam, air, gas, water, high- and low-pressure gases, and high- and low-pressure liquids. Valves 2-in. and larger have an adjustable bypass around the piston to modulate opening and closing of the valve.

409 VALVES—Ludlow Valve Mfg Co, Troy, N. Y. 12-page booklet, No. 103 gives typical applications of the Ludlow Multi-Valve. Four types are given with specifications and list prices for each.

410 HYDRAULIC EQUIPMENT — W F and John Barnes Co, Rockford, Ill. 2 bulletins. 4-page Bulletin VA-100 covers Barnes hydraulic valve actuator, giving advantages, control, and specifications. 6-page catalog describes Barnes gear pumps, showing gear principle, and illustrating several models.

411 VALVES—The Berkeley Engineering Co, 1381 E 17th Street, Cleveland, Ohio. 4-page leaflet on Berkeley floating disk valves for air and hydraulic applications, pressures up to 250 lb. Features are described and pictures illustrate the different types to be used for air or water.

412 VALVES—Ohio Injector Co, Wadsworth, Ohio. 6-page Form No. 508 describes Duo-Bolt gate valve, showing new features, and explaining construction. U-bolt used in place of standard bolts, interchangeable when necessary.

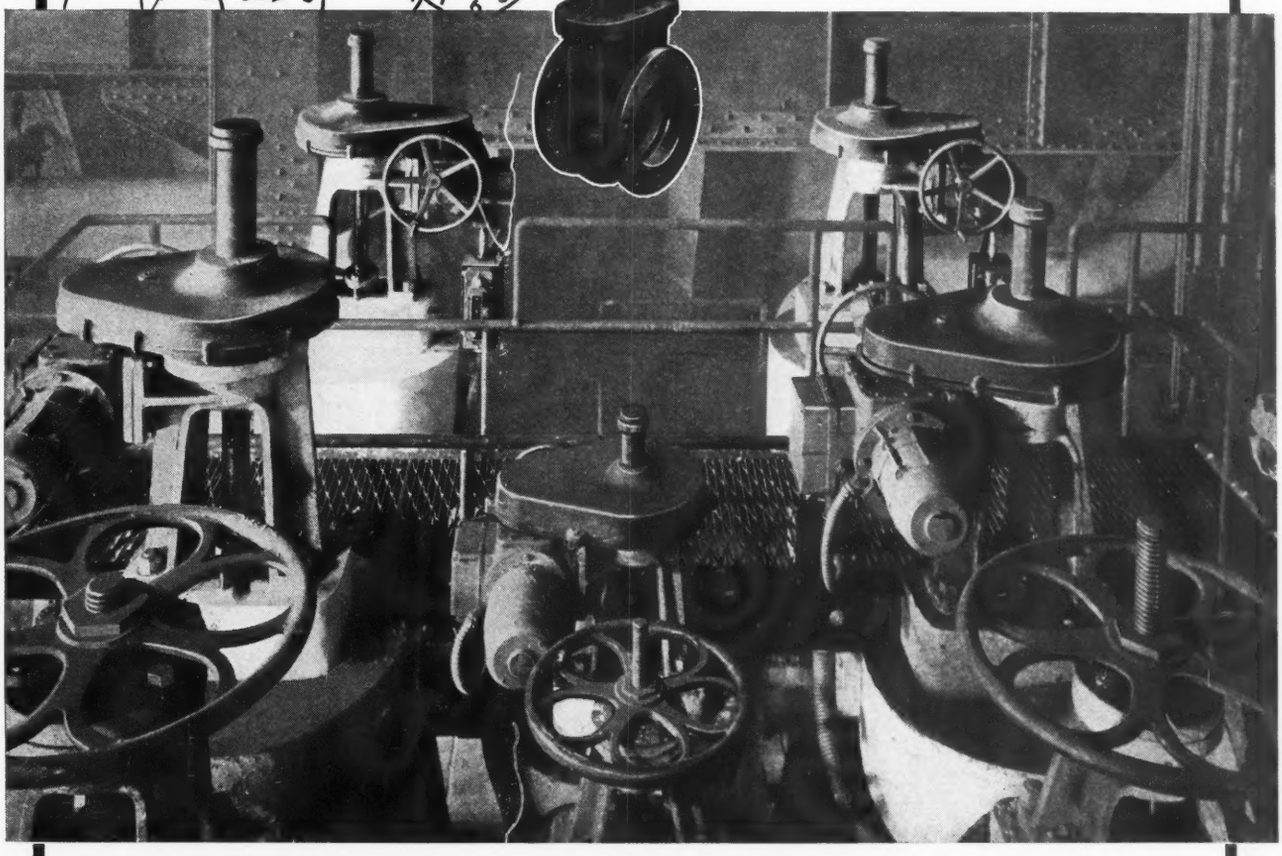
413 VALVE CONTROL—Philadelphia Gear Works, Erie Ave and G St, Philadelphia, Pa. Outline dimensions and description of M5 Limitorque control valve given in 4-page folder. Construction of valve shown by line drawings.

414 VALVES—The Fairbanks Co, New York, N. Y. 54-page catalog No. 21 illustrates and describes bronze and iron globe, angle, gate, check, cross, asbestos-packed, cocks and sphero-ball valves for services between 125 and 350 lb steam working pressure. Price lists included.

415 VALVES—W H Nicholson & Co, 12 Oregon St, Wilkes-Barre, Pa. 4-page bulletin No. 933 covers 2-, 3-, or 4-way, multiport, metering, and distributing valves for air, steam, oil, gas, tar or water for pressures up to 300 lb.

TIME SAVED..

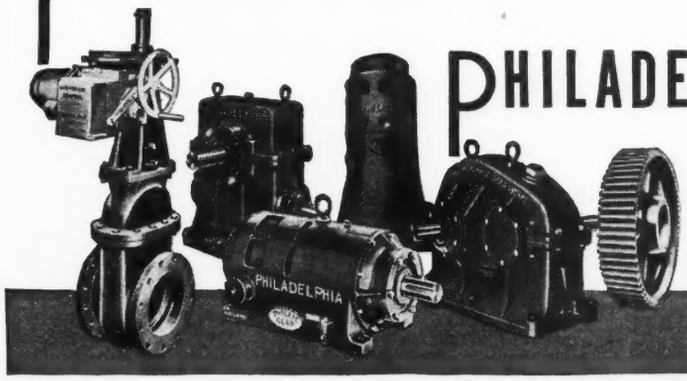
. . becomes
MONEY SAVED



through Philadelphia Limitorque Valve Control

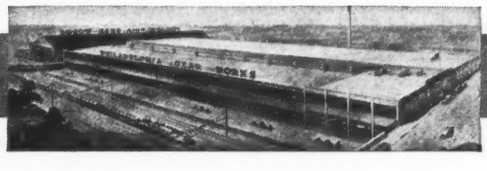
Because it takes less time and less labor to operate large and inaccessible valves with Limitorque definite savings are shown in plant operating costs. One man, by merely pushing a button at a conveniently located control station, can open and close valves up to 72" diameter. It's safer too, for both operator and valve . . . he is kept from the hazards of struggling with large handwheels in high, dangerous spots while the valve parts are constantly protected from damage by Limitorque's Limit Switches. There are many uses for Limitorque in Power Plants, Central Stations, Hydro-Electric Plants, etc. Write and let us tell you more about Limitorque savings for you. Yes, Limitorque can be adapted to present equipment.

Photo shows 7 of 17 Limitorque Controls operating High Pressure Valves on Steam and Boiler Feed Lines in a New England Generating Station.



PHILADELPHIA *Limitorque*

PHILADELPHIA GEAR WORKS
Erie Avenue and G Street, Philadelphia, Pa.
NEW YORK • PITTSBURGH • CHICAGO



INDUSTRIAL GEARS • SPEED REDUCERS • MOTOREDUCERS • LIMITORQUE CONTROL

416 RESEATERS—Standard Reseater Corp, 423 W 126th St, New York, N. Y. Single-page leaflet discusses new method of restoring valves by inserting renewable seat. Entire operation pictured, with explanations and instructions.

VIBRATION CONTROL

417 VIBRATION CONTROL — Coyne Vibration Control, Inc, 250 W 49th St, New York, N. Y. Short article on vibration control, description of products and architectural specifications given in 8-page catalog.

418 RUBBER MOUNTINGS — United States Rubber Co, Mechanical Div. 1792 Broadway, New York, N. Y. "Rubber Mountings for Industrial Equipment" presents properties, advantages, uses, and features of rubber mountings.

WATER TREATMENT

428 SPAULDING PRECIPITATOR—The Permutit Co, 330 W 42nd St, New York, N. Y. 16-page bulletin No. 2204 explains operation of Spaulding Precipitator, cold-lime treatment for softening water. Design, arrangements, and advantages given, with installation photos.

429 WATER SOFTENERS—The Permutit Co, 330 W 42nd St, New York, N. Y. 4-page bulletin No. 2215 has to do with regular water softeners equipped with skids for oil-well-drillers. Reasons for skids explained and advantages of portability shown.

430 WATER ANALYSES—W H & L D Betz, 235 W Wyoming Ave, Philadelphia, Pa. 20-page Water Analysis Manual contains complete facts on water analysis by authorities. Tells how to obtain representative samples and follows through with correct procedure and calculations of results for each test. Chemicals required enumerated, and apparatus illustrated. Several new methods of analysis described, including T H Q and Betz-Hellige methods for sulfate determination.

431 WATER SOFTENERS—Elgin Softener Corp, Elgin, Ill. Bulletin No. 602, 16 pages, describes types of Elgin softeners, aerator equipment, auxiliaries for present equipment, systems for steam plants, and Elgin Zeolites, including synthetic zeolite. Illustrated.

432 WATER TREATMENT—Permutit Co, 330 West 42nd St, New York, N. Y. No. 2205 describes process of conditioning water for ice-making, showing several machines used and advantages of each.

433 WATER TREATMENT—Permutit Co, 330 West 42nd St, New York, N. Y. Bulletin No. 2218 covers Permutit automatic de-sludging valve, for hot lime soda softeners, supplementing regular blowoff valve.

434 WATER TREATMENT—Permutit Co, 330 West 42nd St, New York, N. Y. Booklet No. 2225 on deflector-plate distributor featured in Type "F" filter, also contains information on expansible strainer heads and group control of filter units.

WELDING EQUIPMENT

435 WELDING—Lincoln Electric Co, 12818 Coit Rd, Cleveland, Ohio. "101 Welding Ideas for Low Cost Maintenance", illustrates and describes variety of money-saving repair, fabrication and structural applications of arc-welding.

440 WELDING—A M Byers Co, Pittsburgh, Pa. 16-page booklet No. 2M, revised edition of 1934 issue contains up to date information on welding. Included are results of tests run by National Weld Test Bureau, Lloyd's Register of Shipping, American Bureau of Shipping, and Bureau of Marine Inspection and Navigation.

441 WELDING — Westinghouse Electric & Mfg Co, East Pittsburgh, Pa. Bulletin 2205 contains data, specifications, and instructions for building home-made gas-engine welder.

442 WELDING—Lincoln Electric Co, 12818 Coit Rd, Cleveland, Ohio. 36-page illustrated bulletin No. 401A covers procedures for producing welds in mild steel, for welding metals used industrially and for applying surface metal to meet wear-action.

443 WELDING ELECTRODES — The McKay Co, Pittsburgh, Pa. 16-page booklet identifies "Certified" electrodes, gives principal uses, lengths, and current values. Other types described, and Iron and Steel Institute standard-type numbers and analyses given in table.

OTHER EQUIPMENT & SUPPLIES

444 WIRE ROPE—Hazard Wire Rope Div, American Chain & Cable Co, Inc, Wilkes-Barre, Pa. Catalog No. 20 is pocket-sized handbook on wire rope, containing practical and technical information.

445 FLOOR RESURFACER—Flexrock Co, 2300 Manning St, Philadelphia, Pa. 4-page folder describes Rockflux, said to be only acid-resistant floor resurfacer. Method of application given and list of users included.

446 VENTILATORS — Burt Mfg Co, Akron, Ohio. 6-page folding leaflet includes construction details and damper operation movement of Burt monovent ventilators.

450 TANKS—W E Caldwell Co, Inc, Louisville, Ky. 48-page catalog No. 49 describes complete line of tanks and towers of wood and steel for industrial use. Also shows and describes accessories, such as gages, etc, for towers.

451 CHAIN SPROCKETS—Webster Mfg, Inc, Tiffin, Ohio. 140-page catalog No. 60A covers all types chains, sprockets, and links. Price lists of equipment also furnished.

452 CHAIN DRIVES—Whitney Chain & Mfg Co, Hartford, Conn. 64-page catalog covers standard and special types of Whitney silent chains and sprockets, illustrating each type, and includes tables showing sprocket diameters and gage plug centers.

453 PLATFORM TRUCKS — Elwell-Parker Electric Co, Cleveland, Ohio Bulletin No. A-8416 describes "EP-10" electric-lift platform trucks.

454 SEALS—Frick Co, Waynesboro, Pa. 4-page leaflet No. 137-A describes Frick FlexoSeals for air-conditioning units.

455 SHIMS—Laminated Shim Co, 21–86 44th Ave, L. I. City, N. Y. 2-color chart, gives applications throughout industry of "Laminum," shim, solid brass stock, that can be adjusted by peeling.

456 PORTABLE MIXERS — Mixing Equipment Co, Inc, 1087 Garson Ave, Rochester, N. Y. 8-page bulletin No. 8-65 covers "Lightnin" portable mixers, describing models having gear drive and direct drive. Main specifications included, together with suggested methods of installation on special type tanks.

457 PISTON RINGS—C Lee Cook Mfg Co, Louisville, Ky. 4-page leaflet describes piston rings made from graphitic iron, "Cooktite" 2-piece piston rings, and new "Tinized" rings, listing 3 exclusve features of the rings. Types of rings listed, with specific service for each.

458 GAS GENERATORS—Roots-Connersville Blower Corp, Connersville, Ind. 8-page bulletin No. 100-B13 covers inert gas generators, which are built in portable and permanent installation types for low-pressure distribution and high-pressure tank-storage arrangements.

459 HARD RUBBER—United States Rubber Co, Mechanical Div, 1792 Broadway, New York, N. Y. 7-page bulletin describes hard rubber permeated with continuous inter-connecting pores of microscopic and sub-microscopic size.

460 CONDENSER TUBES — Bridgeport Brass Co, Bridgeport, Conn. 64-page pocket-size manual provides ready reference on condenser, heat-exchanger, and sugar tubes. Tables on brass pipe and copper water tubes included, as well as tables giving weights, specifications, heat-transfer curves.

461 CLAMPS—M B Skinner Co, South Bend, Ind. 32-page catalog No. 38A shows line of repair clamps and saddles for cast-iron pipe. Illustrations show equipment, with methods of installation and list prices.

462 METAL HOSE — Chicago Metal Hose Corp, Maywood, Ill. 38-page booklet No. G-14 contains illustrations and engineering data on Rex-weld corrugated metal hose, asbestos-packed hose and other types, and couplings recommended for each type. Contains a "New Products" section explaining and describing Stainless Steel Bellows, Avoiflex, and RW diesel exhaust hose.

463 FILTERS—The Cuno Engineering Corp, Meriden, Conn. Illustrated booklet, "80 Ways to Make More Money" includes ways of saving by using the Cuno filter. Filter described and the 80 ways are enumerated, each with a brief explanation.

464 BUILDING MAINTENANCE—Flexrock Co, 2300 Manning St, Philadelphia, Pa. 60-page handbook contains information on maintenance of roofs, floors, and building structures. Shows how to repair concrete, to obtain waterproof concrete, to use cotton fabric and pure asphalt on roof work, and to cure basement seepage and solve foundation problems. Non-technically written, contains 200 pictures, diagrams, drawings.

466 HYDROELECTRIC UNIT—James Leffel & Co, Springfield, Ohio. 12-page bulletin H-39 covers Hoppes hydroelectric unit, various recommendations of users, several applications, and information sheet to aid in selection of unit. Rating tables and illustrations included.

467 PERFORATE RUBBER—United States Rubber Co, Mechanical Div, 1790 Broadway, New York, N. Y. 12-page paper gives technical description of "Multi-pore" rubber sheet. Method of perforation explained, illustrated with photographs and drawings. Qualities and applications of "Multipore" listed.

470 REPAIRING CONCRETE FLOORING—Flexrock Co, 2300 Manning St, Philadelphia, Pa. 4-page illustrated bulletin describes unique, inexpensive material for repairing holes, ruts and broken concrete floors. Made with cellulose, it is easily applied, ready for use overnight, and stands up under heaviest conditions. Can be applied indoors or out, and costs only 8 to 14 cents per sq ft.

471 TABLES—Graver Tank & Mfg Co, Inc, East Chicago, Ind. Handy scale has tables showing vertical tank capacities, temperature correction for Brix Spindle, and other conversions.

472 STEAM ENGINES — Filer & Stowell Co, Milwaukee, Wis. 26-page catalog lists all types of engines built by company, and also shows photographically each part of engines. Diagramatic views of engines shown illustrating oiling systems.

473 METAL SPRAYING—Metallizing Co of America, Inc, 562 W Washington Blvd, Chicago, Ill. 26-page booklet gives complete details on metal spraying, with pictures and applications. Necessary equipment listed.

474 IRON CEMENT—Smooth-On Mfg Co, Jersey City, N. J. 40-page pocket-size handbook lists applications of Smooth-On iron cements, for stopping leaks, etc.

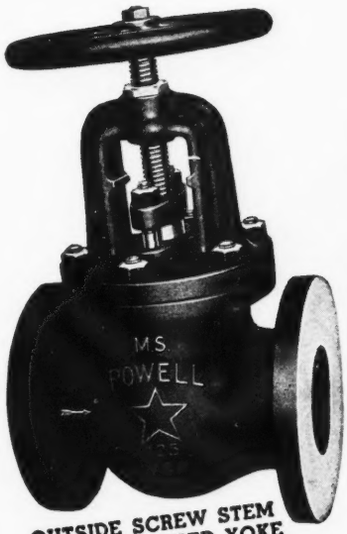
475 SAFETY EQUIPMENT — American Optical Co, Southbridge, Mass. 100-page book describes all types of safety equipment for workers on hazardous jobs, and includes equipment for practically all lines of work.

POWELL IRON BODY VALVES ARE *tough*

Sturdy construction — correct design — exacting workmanship — tested materials and rigid inspection combine to insure long life and trouble-free service.

OUTSIDE SCREW,
RISING STEM,
BOLTED FLANGED YOKE
GATE VALVE

INSIDE SCREW,
NON-RISING STEM,
BOLTED FLANGED YOKE
GATE VALVE



OUTSIDE SCREW STEM
BOLTED FLANGED YOKE
GLOBE VALVE

- Unmatched rugged construction
- Laboratory tested alloys
- Continuous operation
- Universal acceptance

Detailed Information on request.

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO

Peace on Earth . . .

EVERY NATION OF EUROPE has made Christmas something peculiarly, quietly and simply its own. In England they burn the Yule log and gather 'round the punch bowl. In Norway and Sweden they hang paper streamers, let the children seek out their hidden gifts, and scatter grain for the birds. An Italian Christmas includes the revered "praesipio", and Spaniards go to midnight mass on the "noche buena".

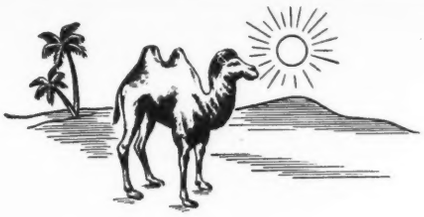
Bavarian children cherish painted toys and gingerbread menageries. In the Tyrol they carve out nativity scenes and sing happy carols. In Holland they carry the great Star of Bethlehem on a pole through the streets. French children hunt lucky coins in the big Christmas cake and the little cakes with a sugared Christmas child on top. South of the Danube, the whole family feasts in a circle on the straw-strewn floor, then children sing to the cows for milk to bathe the newborn "little God". But in every country it is really a "holy day", a family assemblage in quiet observance of the birth of Christ.

And what of us, in America? Oh, we exchange washing machines, checks and jewels; the radio blasts out our carols; our Christmas dinner comes from cans; our children give us lists instead of thankfully receiving the presents we should give far more time and thought to selecting. Christmas! Why, we've lost the art of simple family happiness so long a part of it! Ours is too often just a feast of the pocketbook, not of the heart. Our daily life has made commonplace hundreds of things that the old world hopelessly longs for. The radio, the telephone and the automobile that we thoughtlessly use daily are to those millions abroad a Christmas treat even to see.

But, perhaps, in forgetting simplicity, we are on the threshold of a greater rediscovery, the rebirth of the true concept of Christmas which embattled Europe and Asia have forgotten—"Peace on earth to men of good will!" May we learn to cherish the true value of the peace we have—and strive to build ourselves into men of good will.

George Edwards

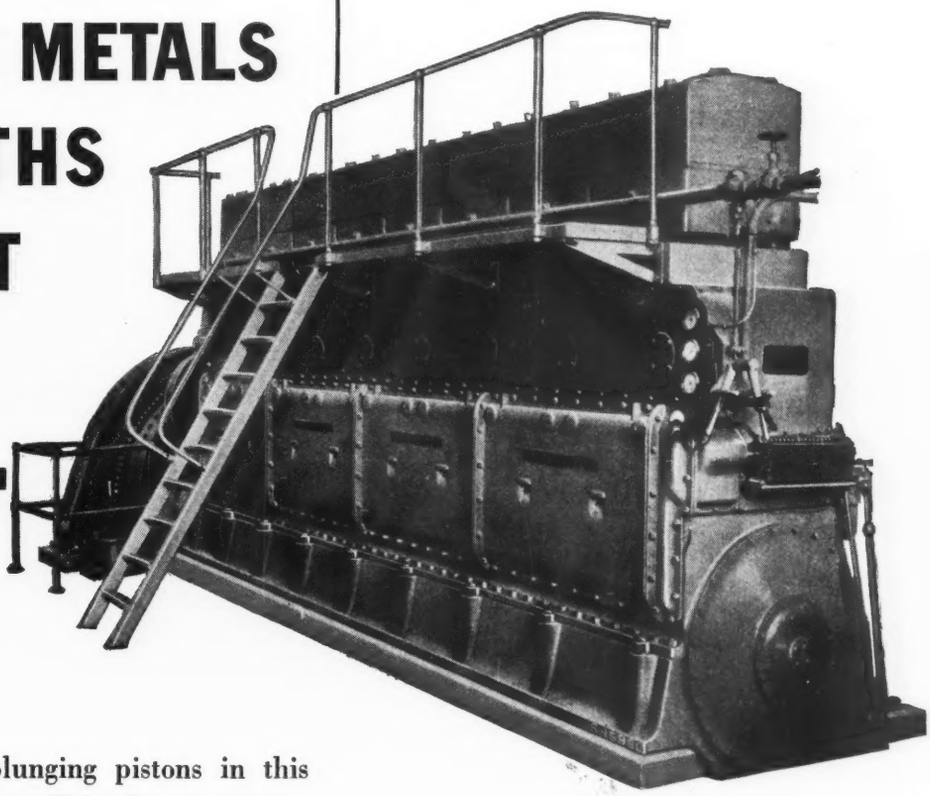
Engineer



A camel goes for days without water . . . but

MODERN METALS GO MONTHS WITHOUT REST!

Worthington EE-8, 1000 BHP industrial Diesel, built by the Worthington Pump & Machinery Corp., Buffalo. This 4-cycle 16" x 10" engine is rated at 327 RPM. It uses a circulating pressure lubricating system and direct injection. See the list below for Nickel cast steels, wrought Nickel steels, Nickel cast irons and Nickel bronzes used to safeguard this prime mover.



Month after month, eight plunging pistons in this Worthington Diesel smoothly, efficiently generate a thousand horse power. Long runs impose severe fatigue stresses on metals. Stresses which are absorbed by the extra toughness Nickel imparts to irons and steels.

Worthington uses Nickel to provide superior qualities in castings and forgings, permit heat treatments to develop maximum physical properties. Nickel alloyed materials uniformly resist growth under prolonged elevated temperatures, maintain close fit and pressure-tightness.

You are invited to write for a convenient check list of Diesel applications of Nickel alloy steels and Nickel cast irons.

WHERE WORTHINGTON USES NICKEL

Cast Nickel Steels:

Main bearing caps, camshaft gear clamp ring, lubricating oil deflector, camshaft gears, air starting lever, intake manifold elbows.

Wrought Nickel Steels:

Air inlet spring guides, air starting valves, delivery valve stems, fuel nozzle bodies.

Nickel Cast Irons:

Cylinder heads, cylinder liners, pistons, inlet valve casings, exhaust valve casings.

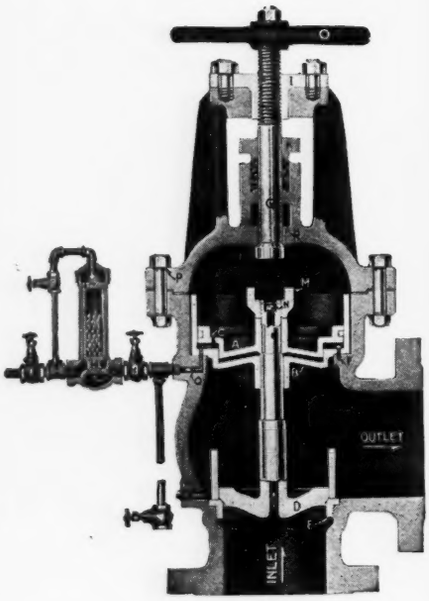
Nickel Bronze:

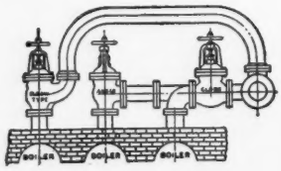
Bellows spindle guide.

NICKEL CAST IRONS ALLOY STEELS

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

Golden Anderson SPECIALTY VALVES





TRIPLE-ACTING NON-RETURN

Make *safety* in your boiler plant a certainty with G-A's triple-acting non-return valve. No boiler explosions or bursting steam lines to damage life and property when you use this double cushioned valve that will not stick or chatter. Test it under pressure. With either flanged ends or welding necks, it handles 150 lbs. to 1500 lbs. The heaviest valves of this kind made, it comes in angle, globe or elbow types from 2½" to 16" in size.

also

Altitude Control . . . Pressure Reducing . . . Throttle and Emergency Stop . . . Check . . . and other types of valves.

Free catalog of complete G-A line sent to you on request. Write today.

GOLDEN-ANDERSON VALVE SPECIALTY CO.

FULTON BLDG. PITTSBURGH, PA.

(Continued from page 90)

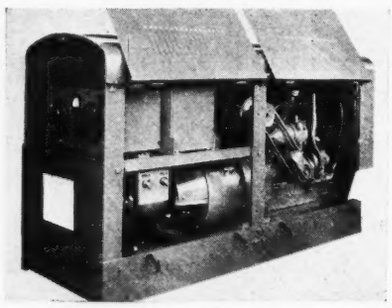
heating ranges above those of ordinary blowpipe. Extensions for extra-heavy work available, removing necessity of heat-shield. Large amount of heat delivered in short time said to cut working time. *Linde Air Products Co, 205 East 42nd St, New York, N. Y.*

WELDING HOSE—In construction of "Condor" duplex hose, two hose lines are held together by permanent web joint, integrally molded, and said to have great strength and flexibility. Joint prevents tangling, kinking and snagging while in use. Can be obtained in one or two braid, or in spiral cord heavy-duty braid. Covers are corrugated and furnished in red and green to distinguish oxygen from acetylene. *Manhattan Rubber Mfg Div, Passaic, N. J.*

WELDING TABLE—Revolving welding table for welding tanks and other circular work. Table is 31 in. in diameter and 25 in. high when horizontal. Has 8 lines of radial slots for bolting work to frame, and is tilted by hand-operated self-locking worm and wheel. Unit tilts to vertical position either side of center line, and in this position will carry load of 600 lb, with maximum diameter of 34 in. Table is driven by ¼-hp electric motor driving through variable-speed transmission and worm-gear reducer. *Ransome Concrete Machinery Co, Welding Div, Dunellen, N. J.*

WELDING ELECTRODE—"Stainweld C" electrode provides weld-metal of physical and chemical properties for welding stainless steels containing 3½% molybdenum. Coating on electrode said to prevent oxidation of weld-metal and keep analysis of deposited metal almost the same as welded metal. Physical properties of electrode similar to 18-8 stainless steel. *Lincoln Electric Co, 12818 Coit Rd, Cleveland, Ohio.*

DIESEL-DRIVEN ARC WELDER — 300-amp unit has gasoline-engine starting from small auxiliary mounted above diesel. Welding generator is "Shield Arc SAE" unit, equipped



with dual continuous control and other features, including independent excitation, laminated magnetic circuit, all-purpose meter. *Lincoln Electric Co, 12818 Coit Rd, Cleveland, Ohio.*

ARC-WELDING ELECTRODE — "Readyweld" is low-carbon steel rod with heavy extruded shielded arc coating, and is intended for general repair work on light-gage sheet metal. Electrode said to provide weld-metal which possesses high strength and ductility. Although designed for alternating-current transformer, welders on low open-circuit voltage unit can be operated with direct-current negative plants. *Lincoln Electric Co, 12818 Coit Rd, Cleveland, Ohio.*

WELDING ELECTRODES—Page "Surface-Saving" electrodes are alloyed to meet demand for tough abrasion resisting materials. Said to be useful in welding surfaces and metal parts subject to excessive wear. Electrodes all inter-alloy

←MODEL CPH

for horizontal air transmission lines. Model CP for vertical lines. (1) container; (2) baffle; (3) housing; (4) insert; (5) drain cock.

MODEL DS→

Combination Silencer-filter for internal combustion engine and compressor intake. (A) Rectifying chamber (a series); (B) dry Feltex Filtering Medium; (C) Radial Fin Construction; (D) rigid, galvanized mesh frame; (E) reinforcing tube.

WITH AIR FILTERS

» » » » Check over the machinery and processes under your supervision. Are gasoline, gas or Diesel engines, compressors, blowers or electric motors operating without efficient air filters? Do air-powered tools run on unfiltered air? Are air-using processes lacking clean, dry air? Is intricate, expensive machinery unprotected from dust?

AIR FILTERS ARE ECONOMIZERS

In every case, correct air filter installations will reduce operating expenses and maintenance costs. The reasons are simple. Abrasive dust is everywhere. Unless kept out by efficient filters, it scours away cylinder walls, wears out reciprocating parts, clogs delicate machinery. Foreign matter in air transmission lines (pipe scale, rust, dirt, oil and moisture) damages air-using tools; interferes with air-using processes. Facts and figures prove the savings made by high grade air filters. Use them everywhere and watch cost figures drop.

Protectomotor Air Filters 99.9% Efficient

Tests made by the University of California prove that Protectomotors possess an efficiency only .1% less than absolute. This extraordinary performance is the result of several factors: (1) the patented Radial Fin Construction provides large filtering area in small space, minimum restriction of air flow; (2) the famous Feltex Filtering Medium is tough, long wearing, efficient in stopping the finest dust particles; (3) Protectomotors are built under the closest possible supervision from high quality, selected materials. You can SAVE MONEY using them—write for catalog and data.

Air Filter PROTECTOMOTOR AIR FILTERS *Headquarters*

STAYNEW FILTER CORP., 23 LEIGHTON AVE., ROCHESTER, N. Y.

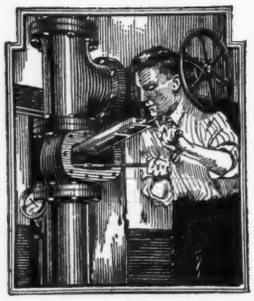
KEEP VALVES TIGHT

DEXTER RESEATING MACHINES

GLOBE VALVES

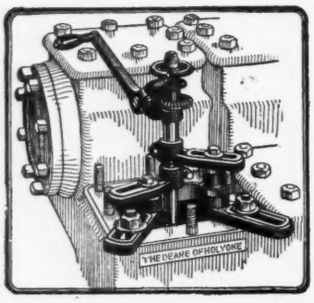
Plants all over the world are using this machine. Made in various capacities for small and large users. Operation is simple and results positive. Adapted for all types of globe and angle valves.

For GATE VALVES



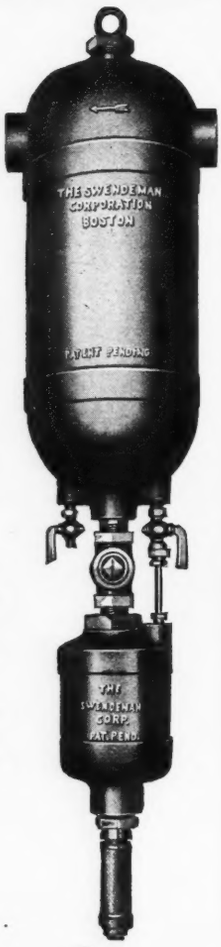
Solves the problem for gate valve users by enabling them to reseat on the line. The seats and gate or split discs are refaced exactly alike—making a tight seating valve. Made from 1½" up to 48".

Investigate the New Dexter Lapping Device for hard metal trimmed globe and gate valves. This is a matter of great importance to users of high pressure valves



PUMP VALVE SEATS

Reciprocating pumps can be kept operating at full efficiency by keeping the seats smooth and true. Easily applied to valve chamber and refaced in place. A big saving.



KEEP AIR LINES FREE from OIL and WATER

SWENDEMAN SEPARATORS

Swendeman Separators discharge water and oil automatically and efficiently *as they are precipitated.* No manual draining is required. Installation easily and quickly made.

These units are available in three types. Type A—used for all classes of industrial work where pressure variations are not necessary. Type C is equipped with a shut-off cock to permit the removing of the valve for cleaning without loss of air. A desirable feature where air is in constant use.

The new Type D—Dexter Automatic Air Separator for use where pressure regulation is essential, as in paint spraying, etc. This embodies one of the greatest improvements in AIR Separation in recent years.

Ask for your copy of our new catalogue of the Swendeman Air Separators also Catalogue No. 40 on the Dexter Valve Reseating Machines.

THE LEAVITT MACHINE CO.

10 EAST RIVER ST. ORANGE, MASS.

Canadian Distributors:—

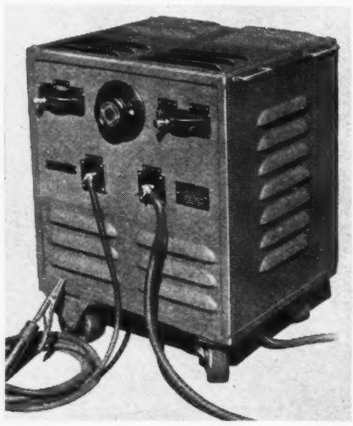
The Canadian Fairbanks-Morse Company Limited

15 Branches Throughout Canada

with base metal when applied by metallic arc method, forming true welding bond. *Page Steel & Wire Div, American Chain & Cable Co, Inc, Monessen, Pa.*

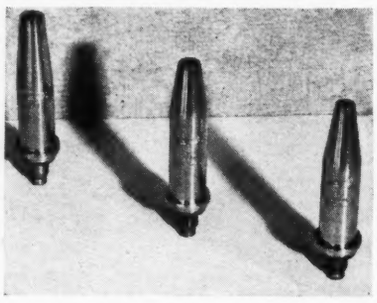
LIQUID SOLDERING FLUX—"Special X" liquid soldering flux can be used on brass, copper, cadmium, stainless steels, zinc, monel, iron, and many other alloys. Lowered surface tension and good wetting power of flux cause quick and uniform flow into all cracks and crevices, and research has shown that it is especially good in the production of line soldering of expansion valves, electrical controls, small pressure tanks, etc. *Industrial Service Laboratories, 915 W Oklahoma Ave, Milwaukee, Wis.*

LOW-CURRENT ARC WELDER — "Weld-O-Tron" unit can be used with currents as low as 5 amp, using newly developed 1/32- and 3/64-in. electrodes. Heart of this unit is multiple-tube polyphase mercury-vapor rectifier.



Unit claimed to combine light weight, long life and absence of rotating parts with advantages of both ac and dc arc welding. *Allis-Chalmers Mfg Co, Milwaukee, Wis.*

OXY-ACETYLENE NOZZLES — New nozzles said to be superior to regular cutting nozzles for three reasons (1) cutting oxygen passage is highly polished, producing smooth gas flow without deflection or turbulence. (2) Preheat



holes are smaller and spread over a larger circle so that heat is less concentrated on line of cut. (3) Cutting oxygen passage is exactly vertical when blowpipe is vertical, so that when cutting circles or shapes, face of cut is true all around. *Linde Air Products Co, 30 E 42nd St, New York, N. Y.*

WELD-SPATTER PREVENTATIVE—"Glyptal 1294 Gray" is a pigmented version of previously announced Glyptal 1294 Clear and will, like latter, prevent adhesion of weld spatter when applied to parts before welding. On lap welds, it will prevent corrosion at overlap. At same time, said to serve as excellent base for painting. *General Electric Co, Schenectady, N. Y.*

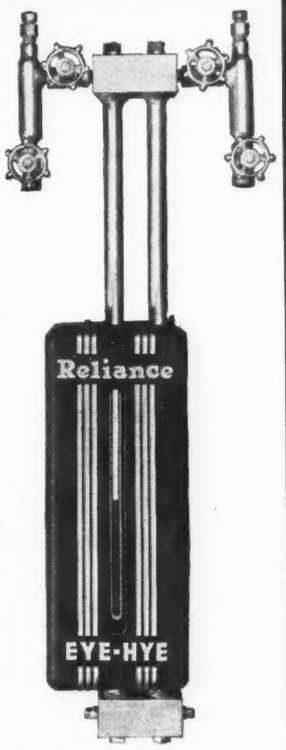
WELDING LIQUID AND ROD—"Colalloy" atomic welding liquid is brushed onto metal

Save thousands of steps in 1940 . . . hours of time

and make your power plant SAFER with

RELIANCE EYE-HYE

Remote Reading Water Level Gages



Put the brilliantly clear EYE-HYE right at your elbow where you can check water levels easily—*any minute*—for safety to boilers and equipment. Avoid expensive repairs, shut-downs and accidents.

EYE-HYE is always dependable, accurate—is easy to install, costs little in upkeep. Connects to the boiler drum through two small tubes—no expensive piping.

Hundreds of EYE-HYE users now enjoy new freedom from water level worries. Add this modern facility to your boiler room for safety and economy. Write today for Bulletin 382.

Reliance

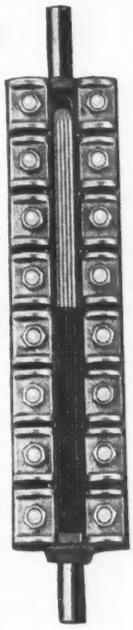
TRADE MARK REG. IN U.S. PAT. OFF.

Better Vision Greater Safety

with improved

RELIANCE PRISMATIC

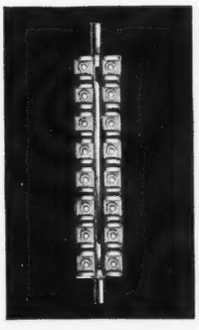
Water Gage Insert



Meet that vital need for reading water levels quickly, accurately, safely with the Prismatic Insert for clear-cut reading at the drum. No guessing or neck-stretching—you see water *black*, steam *white*.

Prismatics won't shatter—an important safety angle. Best quality American-made glass, heat treated. Improved alloy iron body with new clamping principle, grips glass tight without danger of binding.

With this better, low-cost Prismatic Gage you provide the safety and water reading facility that your staff deserves. In service in hundreds of plants. Write for Bulletin 391.



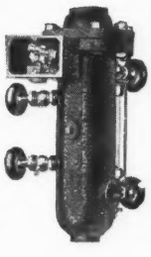
MICASIGHTS

Remove Danger of Flying Glass

Save costly damage claims and frequent upkeep expense

Reliance MICASIGHTS in standard models withstand pressures to 2000 lbs. Unbreakable mica securely clamped in a forged steel body. Unusual safety and long life. Built for any pressure or visibility range. Easily, quickly installed. Send for MICASIGHT Bulletin.

Safeguard Any Liquid Level with Instant-Acting RELIANCE JUNIOR ALARMS

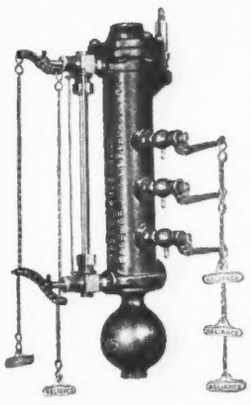


These sensitive, *rugged* small Alarms warn when liquid levels need attention, actuate pumps and other controls to correct dangerous conditions. Easy to install, low in cost. Thousands used in many types of service. Write for Junior Alarm Bulletin.

Reliance

Reliance *Boiler Alarms*

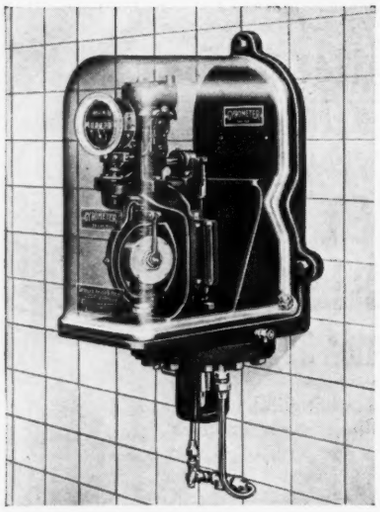
assure you the vital economy of Safe Uninterrupted Power



You can depend on the never failing Reliance Alarm to signal when water levels go too *high* or too *low* for safety. Guaranteed non-sinkable floats actuate alarm valves unfailingly. Extra-sturdy bodies stand the gaff of toughest plant conditions. In 55 years no Reliance Alarm has been known to fail in an emergency. Make sure of safe continuous boiler operation. Write today for bulletin on Alarm Water Columns.

Reliance
SAFETY WATER COLUMNS

The Reliance Gauge Column Company, 5902 Carnegie Ave., Cleveland, Ohio



View of Wall Mounted Gyrometer Showing Case in Phantom Form.

The New

SIMPLEX GYROMETER

An Inexpensive Flow Meter for

CORROSIVE LIQUIDS OR GASES

A totalizing flow meter actuated by gyroscopic force is the latest contribution of Simplex to the chemical and allied industries. Mathematically complex but mechanically simple, this extremely accurate instrument is now available for integrating the flow of any fluid, whether liquid or gaseous. It is adaptable to any size pipe or main and any type of primary device. The Gyrometer's working parts are indefinitely protected against dust, moisture and sediment . . . a fool-proof mechanism. Before you decide on the purchase of a flow meter for any purpose

WRITE US TODAY FOR COMPLETE TECHNICAL DATA

SIMPLEX VALVE & METER CO.

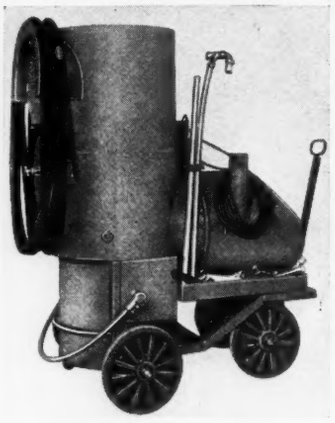
6800 UPLAND STREET

PHILADELPHIA, PA.

at point where welding is to take place, rod applied, then subjected to heating at about 450 F. Bond is atomic, and while this process is not offered as a substitute for welding by regular methods, it can be used in many applications. Tensile strength at welds was checked at about 10,000 lb psi, according to manufacturer. *Colonial Alloys Co, Philadelphia, Pa.*

Wrenches & Tools

VACUUM CLEANER—Large cleaner has capacity of 7½ cu ft of dust. Principal feature is portable dust container, on wheels, which may be pushed into place under cleaner. Seal be-



tween bin and cleaner insures maximum efficiency. Available as direct or belt-driven unit. Vacuum producer has wide clearance between still and moving parts, reducing wear. *Spencer Turbine Co, Hartford, Conn.*

VAPOR SPRAY CLEANER — "Hypressure Jenny" has all mechanism on end panel, and is operable on pressure up to 150 lb within 1½ minutes. Has pressure-atomizing fuel-oil burner

and non-clogging heating coils. Model J-R, for heavy duty, illustrated. Units may be mounted on wheels for portability, and all have nozzle-control feature which saves cleaning solution and fuel. *Homestead Valve Mfg Co, Inc, Coraopolis, Pa.*

DOUBLE-OFFSET WRENCHES—"Boxocket" wrenches have two different wrench openings, and all sizes from $\frac{7}{16}$- to 1⅝-in. are included within range of this series. Wrench head grips the nut on all sides and distributes the pulling strain evenly. Can be used over long threaded bolts on which socket wrenches cannot be used, or in small clearance spaces above the bolts, double broaching of head permits use in close

REX-BELLOWS

The "True Bellows" 18-8

STAINLESS STEEL FLEXIBLE TUBING

DIVIDED UNITS and FULLY CORRUGATED UNITS... POSITIVE WELD... SINGLE, DOUBLE and TRIPLE PLY for Required Strength

(Also manufactured in other alloys)

RBD-40 Divided Bellows, Unbraided

RBD-41 Divided Bellows, Braided

RB-40 Fully Corrugated Bellows, Unbraided

RB-41 Fully Corrugated Bellows, Braided

BOTH DIVIDED AND FULLY CORRUGATED REX-BELLOWS UNITS PROVIDE THE FOLLOWING...

- ✓ **Corrosion Resisting Qualities of Stainless Steel**
- ✓ **Fatigue Factor Minimized**
- ✓ **Flexibility with the Strength of Stainless Steel**
- ✓ **Movement in Radial and Axial Planes (Unbraided)**
- ✓ **Pressure Strength Increased with Reenforcing Braid**
- ✓ **Vibration Absorbed in Bellows Corrugations**
- ✓ **Braid Anchorage Secure**
- ✓ **Circular Resistance Seam-Welded Ends Eliminate Flux**
- ✓ **Divided Sections, Continuous Construction**
- ✓ **Radial Movement Retains Parallel Ends**
- ✓ **Shorter Lengths Required**
- ✓ **Uni-metal Assemblies Deter Corrosion**

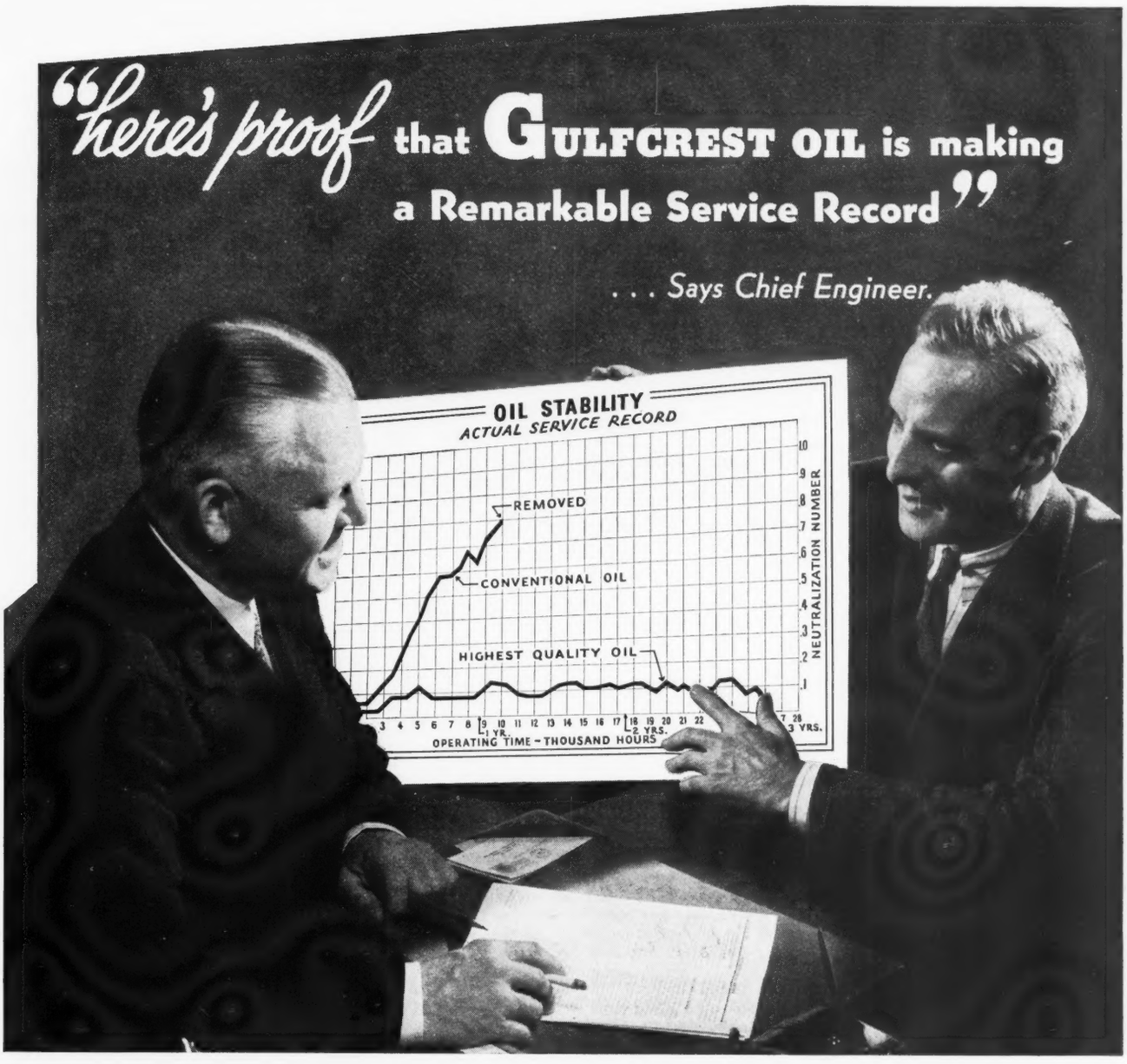
TYPICAL APPLICATIONS...

High Temperature Flexible Steam Connections—Houdry Refinery Process. High Temperature Flexible Gas Connections—Gas Gun Type Burners. High Temperature Flexible Air Connections—Annealing Furnaces. Low Pressure Flexible Gas Connections—Industrial Furnaces. Low Pressure Flexible Steam Connections—Paper Mill Dryer Bearings. High Temperature Flexible Water and Steam Connections—Platen Presses. Corrosive Flexible Liquid Connections—Chemical Weigh Tanks. Corrosive Flexible Gas Connections—Coke Ovens. High Temperature & Corrosive Flexible Connections—Gasoline engines. Low Pressure & Corrosive Flexible Connections—Aircraft Instruments.

Send for Bulletin SS-16 for Engineering Data and Details.

CHICAGO METAL HOSE CORP.

MAYWOOD ILL. (Chicago Suburb) U. S. A.



. . . Service Records prove *GREATER STABILITY* of this Quality Turbine Oil

OPERATING data covering the performance of Gulfcrest Oil in major turbine installations throughout the country are verifying daily the fact that this improved type of turbine lubricant possesses remarkable stability. After years of service, Gulfcrest shows so little evidence of deterioration that operators find it is in as good condition as when first put into the system.

Gulfcrest is an *entirely different kind* of turbine oil—for this reason: It has been refined not only by conventional processes, but by Gulf's Alchlor process, an advanced method developed by Gulf refinery technologists for removing undersirable hydrocarbons and other impurities which cause oxidation and sludge formation. As a result of this extra purifying process, Gulfcrest Oil possesses a higher degree of stability than any turbine lubricant of which we have record.

We suggest that you talk with the Gulf engineer about this remarkable turbine oil at your first opportunity. He will be pleased to give you complete details—and you will be under no obligation . . . Gulf Oil Corporation—Gulf Refining Company, Gulf Building, Pittsburgh, Pa.

GULF INDUSTRIAL LUBRICATION

Fairbanks Bronze and Iron Valves

Fairbanks Valves are made in globe, angle, gate, check and ball types—in both bronze and iron—for practically every steam, water, air, oil and acid condition, for pressures from 125 to 350 lbs.

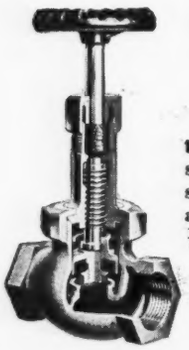


Fig. U-01, Bronze Globe, Union Bonnet

Renewable composition disc. 150 lbs. steam working pressure. Also made in angle pattern. Sizes, ⅛ to 3 in.

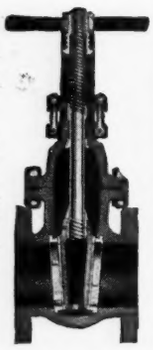


Fig. 0302 Iron Body Gate

Renewable seat rings, solid wedge pattern. Stationary spindle. 150 lbs. steam working pressure. Made in Standard, Heavy and Extra Heavy pattern. Also made with screwed ends. Sizes, 2 to 16 in.

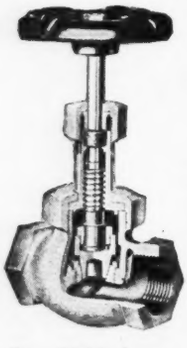


Fig. 0501-P, Bronze Regrinding Globe

Plug type. Renewable nickel alloy seat and disc. 200 lbs. steam working pressure. Also made in angle pattern. Sizes, ¼ to 3 in.

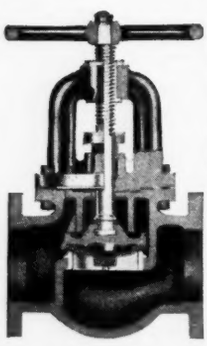


Fig. 0101, Iron Body Globe

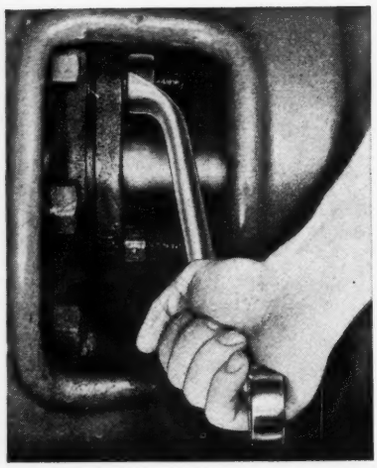
Renewable composition or regrinding disc. 150 lbs. steam working pressure. Also made in angle type and in Heavy and Extra Heavy pattern. Sizes, 2 to 8 in.

Write for Catalog 21

THE FAIRBANKS COMPANY

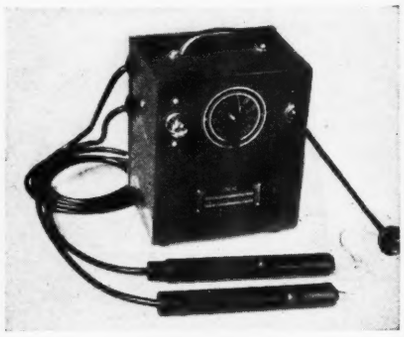
397 Lafayette St., New York, N. Y.

Factories: Binghamton, N. Y., Rome, Ga.



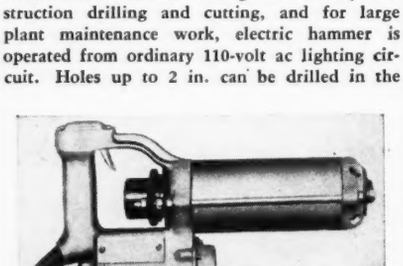
places where handle movement is limited. *Snap-on Tools Corp, Kenosha, Wis.*

INSULATION TESTER—Testing device for voltages up to 2500, indicates whether or not there is a short, ground or broken wire. Said to be specially suited for testing insulation of low-voltage equipment. All current-carrying



parts are carefully insulated. Other safety features include: 3-wire primary cord, spring-operated cover over high-potential primary cord, and a red indicating lamp. *Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.*

ELECTRIC HAMMER—Designed for heavy construction drilling and cutting, and for large plant maintenance work, electric hammer is operated from ordinary 110-volt ac lighting circuit. Holes up to 2 in. can be drilled in the



hardest concrete by using star drills, and by using stone points or cold chisels, the hammer will cut through masonry floors and walls for risers, doors, windows, etc. Hammer uses patented construction made up of two magnets wound around a barrel in which is a free moving, heavy piston that strikes directly on the shank of the tool being used. *The Syntron Co, 492 Lexington Ave, Homer City, Pa.*

CHIPPING HAMMER-BRUSH—Combination consists of drop-forged steel chipping hammer, with heavy-duty wire brush rigidly mounted on top side. Hammer breaks and chips scale or other formation and wire brush cleans surface. *St. Pierre Chain Corp., Worcester, Mass.*

(Continued on page 140)

Babbitt
—Adjustable—
SPROCKET RIM
with Chain Guide

KEEP YOUR MEN OFF LADDERS— control valves from the floor

With Babbitt Sprocket Rims on your overhead valves, you can control valves instantly from the floor. Far quicker and safer than climbing ladders.

Babbitt Rims are easily attached in a few minutes, are inexpensive and assure safe, positive and instantaneous overhead valve operation. Available for valves of every make or style. Write for details.

BABBITT STEAM SPECIALTY CO.
New Bedford Mass.

Save Air—Save Dollars
WITH
ROCKWELL BLAST GATES

Threaded Slide Type

Flanged Slide Type

For Low Pressure Air

•

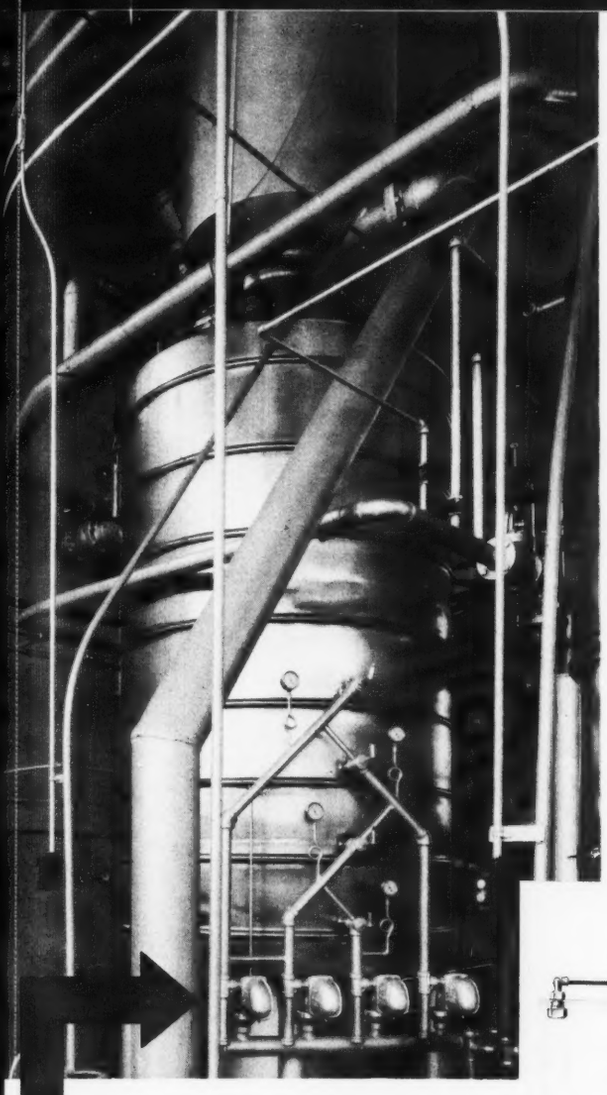
Slide Type
Butterfly Type
Wafer Butterfly Type
Kwikleen Type

•

Write for catalog No. 3760

•

W. S. ROCKWELL COMPANY
50 CHURCH ST., NEW YORK



Mojonnier Vacuum Pan with four Sarco Float-Thermostatic Steam Traps draining the "streamlined" stainless steel coils. Catalog No. 138.

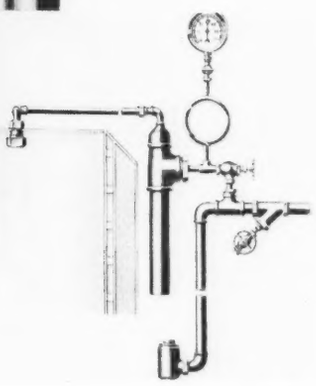
"Equipped with Sarco"

IS THESE MANUFACTURERS' GUARANTEE

"Milk plant engineering from the laboratory to the largest vacuum pans, evaporators, and pasteurizers has always been closely allied with the use of steam. From the beginning we have used Sarco products, primarily because their range of types and sizes enables us to select the particular device which will give our customers maximum service with highest operating efficiencies. Equally important is the fact that although we ship Mojonnier equipment to all parts of the world, our servicing costs on steam traps and accessories are practically nil.

"We use Sarco Thermostatic Steam Traps, Float Traps, Temperature Regulators, both self-contained and electric, and Blenders on our equipment with excellent results. We also use Sarco Specialties on our own plant heating system."

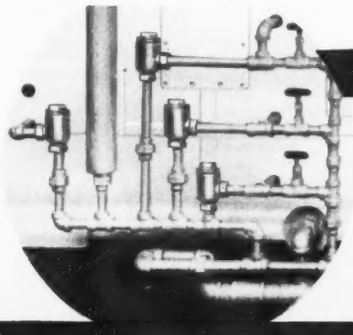
Mojonnier Bros. Co.

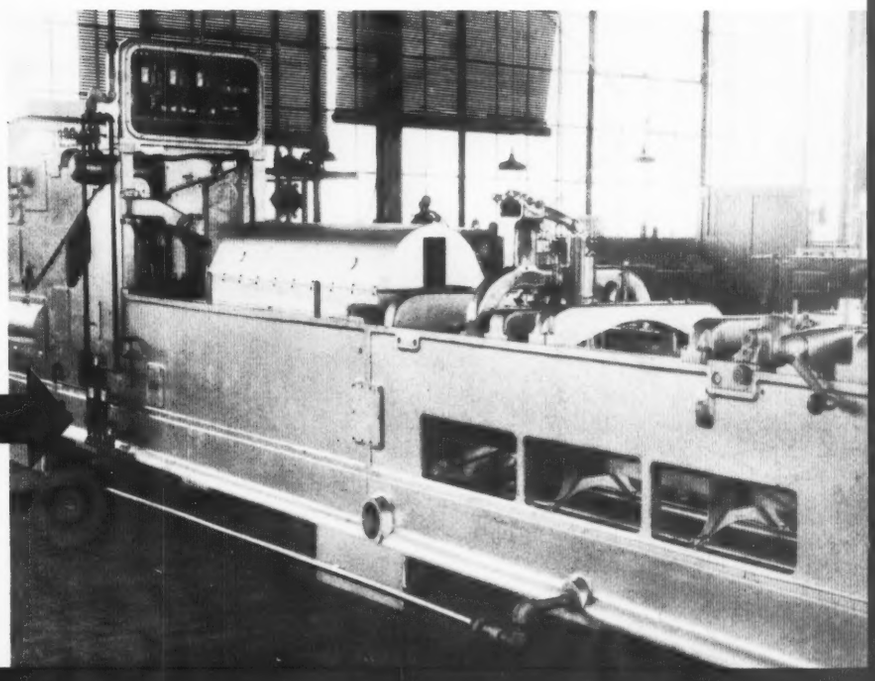


At Mojonnier everything is scientifically predetermined. Here is a diagram showing the hook-up for the air and foam equipment used on pasteurizer. It is a compact, accessible and efficient hook-up with Sarco No. 9 Thermostatic Trap and Sarco Strainer as standard equipment. Wise buyers prefer that the equipment manufacturers furnish the traps. Wise manufacturers use Sarco products and take advantage of Sarco experience and nation-wide service.

This remarkable machine built and leased by Ex-Cell-O Corporation, Pure-Pak Division, Detroit, streamlines all the functions of a modern dairy and forms its own container.

The preheating and pasteurizing units on each machine are equipped with four Sarco No. 9 Thermostatic Steam Traps. A Sarco Float-Thermostatic Trap on the defoamer eliminates the use of a separate condenser. Selected only after exhaustive competitive tests, more than 100 Sarco Traps are already in service on these new machines. Ask for Catalog No. 148.

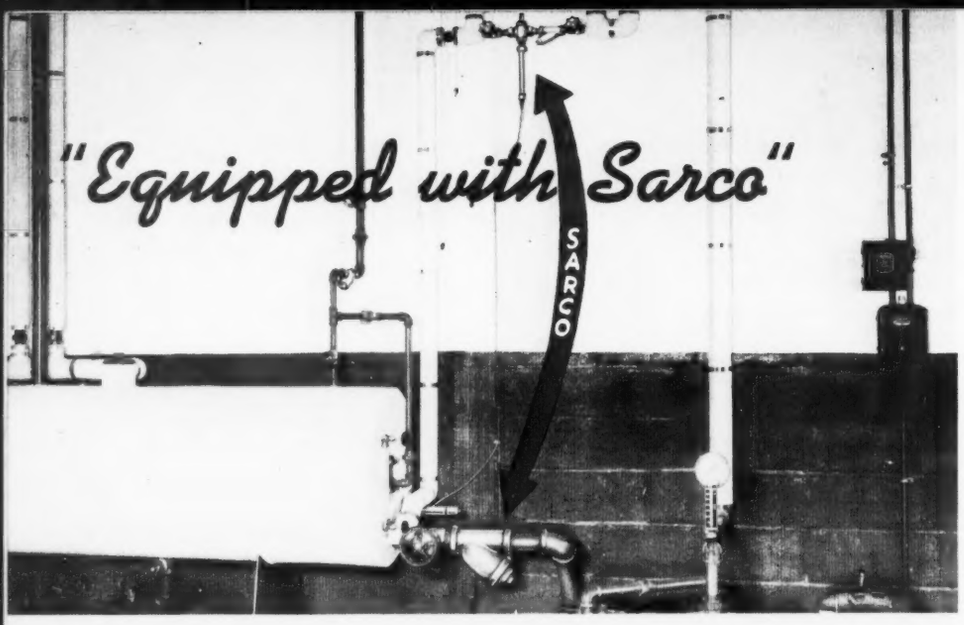




COMPLETE STEAM SYSTEMS FOR HEATING AND INDUSTRY

SARCO COMPANY, INC.
132 Madison Avenue, New York, N. Y.
SARCO CANADA, LTD., FEDERAL BLDG., TORONTO, ONT.
SEE PHONE BOOK FOR LOCAL SARCO REPRESENTATIVE

SARCO



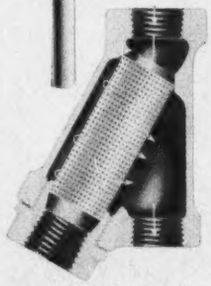
SCHAUB BOILER RETURN SYSTEMS

The Fred H. Schaub Engineering Company, Chicago, are well known in the power plant and laundry fields. At the left is a Schaub "Preheet" System with a Sarco TR-21 Temperature Control and Sarco Strainers. It automatically maintains feed water at desired temperatures. Sarco is standard for all Schaub equipment. Another case where the manufacturer insures performance and efficiency by specifying and installing Sarco. Catalog No. 152.

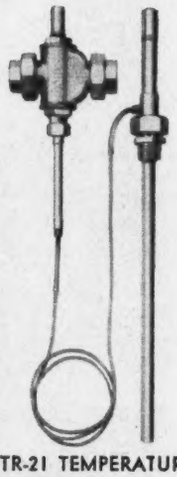
KITCHEN EQUIPMENT

To insure efficiency and reliability of operation, manufacturers of all types of steam equipment are standardizing on the policy of selecting the steam accessories. At the left we show a battery of kettles equipped by the manufacturer with Sarco No. 9 thermostatic steam traps. At the right—three other Sarco steam accessories that are used extensively by the manufacturers of steam operated equipment.

TR-40-S TEMPERATURE CONTROL



SARCO STRAINER



TR-21 TEMPERATURE CONTROL

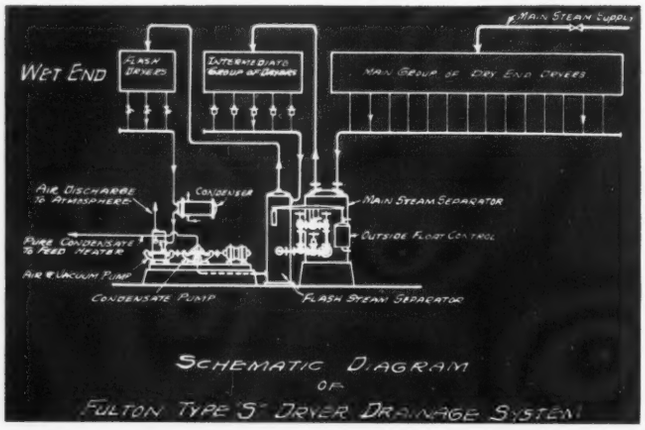
SARCO REGULATOR STANDARD ON PAPER MACHINE EQUIPMENT

Illustrations at right show special condensation removal systems for large paper machines.

For the last two years, the makers have used Sarco TR-21 Temperature Regulators exclusively on the heat exchanger shown at the right.

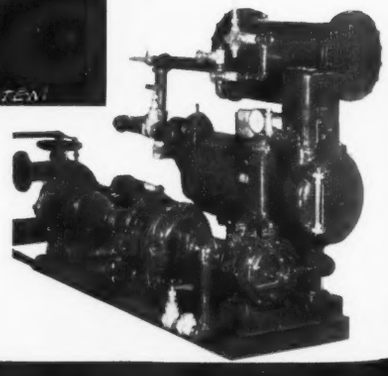
This exchanger is used to cool air and non-condensible gases for removal by the vacuum pump. The hot condensate is handled by the centrifugal pump also shown.

Asked why they switched to Sarco, they said, "It gives us less trouble than any other." Catalog No. 152.



SCHEMATIC DIAGRAM OF FULTON TYPE "S" DRYER DRAINAGE SYSTEM

Hook-Up drawings like this, applying particularly to your problems, may be obtained from the nearest Sarco Representative.

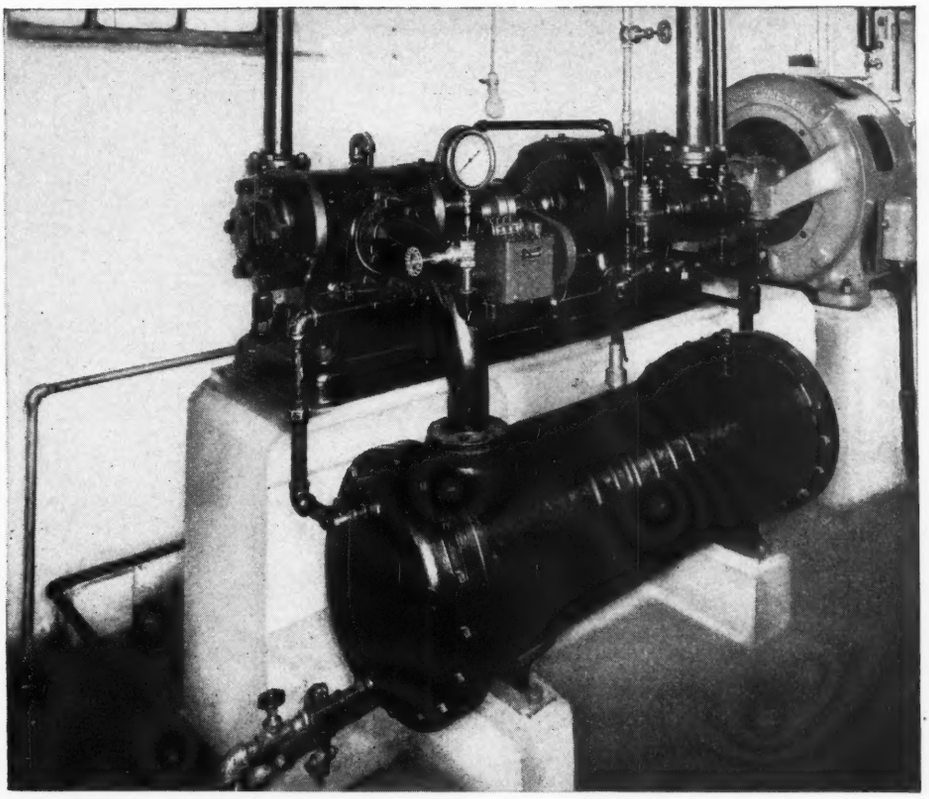


SARCO
183 MADISON AVENUE, NEW YORK, N.Y.

HARD TO BEAT—

INSTALLED FEBRUARY 1936

MAINTENANCE $3.90



Fuller Rotary Two-stage Compressor installed at Bethlehem Foundry & Machine Co., Bethlehem, Pa. Capacity 330 c.f.m. actual free air delivery, 100 lb. pressure.

February 1936, Bethlehem Foundry & Machine Company, Bethlehem, Pa., installed a Fuller Rotary Two-stage Compressor, illustrated above. This machine furnishes air for general plant duty. Day in and day out, it has been running along, with practically no cost for maintenance—$3.90.

How does this compare with maintenance on your compressor installations? Many users of Fullers are enjoying the same experience, saving many dollars in maintenance and operating costs every year. And why not? Inherent characteristics and simple construction insure long wear and maintained capacities for the life of the machine—no valves to leak or seats to grind; no main or connecting rod bearings to take up. In fact, no multiplicity of parts requiring frequent attention or adjustment.

YOUR COMPRESSORS — spot — WHERE YOU NEED THE AIR

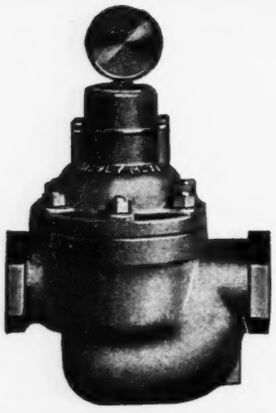
FULLER COMPANY
CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.

C-37A

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · · AIR-QUENCHING COOLERS · · · · BIN SIGNALS

HENSZEY



BOILER FEED WATER METER

This meter accurately measures boiler feed water, hot dirty blowdown, condensate, chemicals, milk, fluid foods, and many other liquids that cannot be measured by ordinary meters. They can be furnished to read in gallons or pounds at any specified temperature. Sizes — 10, 30, 50, 100, 150, 300, 600, 1200 g.p.m., cold water, steady flow rating. Connections — ¾", 1", 2", 3", 4", 6".

FLOW INDICATOR

Where the rate of flow of such liquids as hot dirty blowdown water, boiler feed water, condensate, gasoline, light oils, chemicals, milk, fluid foods, and many other "hard to measure" liquids is needed, this sturdy, accurate instrument will give that information. There are no complicated parts to get out of order. Special sanitary model is easily sterilized for cleanliness. Indicates flow from zero to 100% on a uniformly graduated dial.

Sizes—10, 30, 50, 100, 150, 300, 600 g.p.m. maximum flow. Pipe connections ¾", 1", 1¼", 1½", 2", 2½", 3", 4".

Use the coupon below to get further information.

HENSZEY COMPANY

Dept. D12B **Watertown, Wis.**

We are interested in further information about

☐ Henszey Feed Water Meter
☐ Henszey Flow Indicator

Firm .....

By .....

Address .....

BOLT THREADER—"Toledo" No. 101 provides positive die adjustment for over, under, and standard threads. Segmental dies may be reground and can be adjusted by turning cam ring. Threads bolts from ¼- to ⅝-in. rods

U S S or S A E, and ⅜-, 7/16-, and ½-in. pump rod. Die stock measures 17-in. over-all and weighs 2¾ lb. *The Toledo Pipe Threading Machine Co, Toledo, Ohio.*

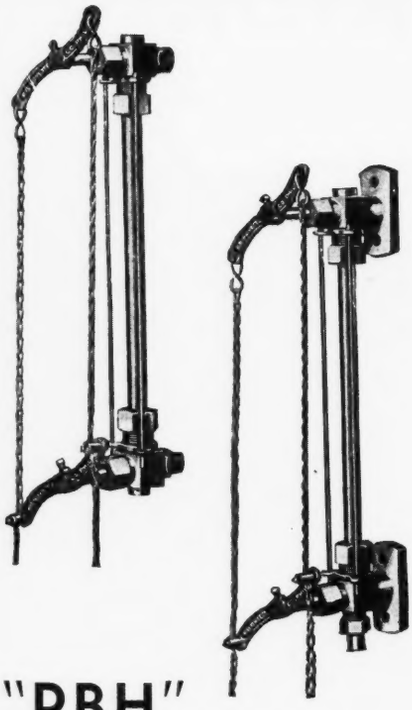
PNEUMATIC SCALING HAMMER—"Roto" pneumatic scaling hammer de-scales boiler drums, headers, evaporators, and drill holes in concrete. Also used to chip anything from

wood or steel. Hammer weighs less than 6 lb, and operates from 40- to 90-lb pressure, consuming 10 cu ft of free air per min. Ground steel plunger only moving part, and flat chisel and star drill are furnished with each hammer. *The Roto Co, 134 Sussex Ave, Newark, N. J.*

HEAVY DUTY WRENCHES—Line of heavy-duty box wrenches with interchangeable tubular handles are made in both double-offset and 15-deg-angle types. Are dropforged of chrome-

alloy steel, carefully heat treated and heavily plated, with polished heads. Each type is made in seven sizes with double-hexagon openings ranging from 1⅜ to 2¼ in. *Bonney Forge & Tool Works, Allentown, Pa.*

CLEANSING JET—"Hi-Pressure" cleaning jet available in both portable and stationary models, can be used to clean pumps, machinery, coils, floors, etc. Heart of jet is mixing chamber, where water is admitted first. Then steam, which in process of condensation produces vacuum and draws in detergent, is forced into chamber, at the same time maintaining pressure



"PBH" Vertical Water Gauges

Quick-Closing

Opened or shut by less than a quarter-turn. When a glass breaks, the gauge is shut off by a pull of the chain. No scalds; no burns. Steam and water passages are ample and have no "pockets" to collect sediment. Body is extra heavy and of best steam metal. All valve stems packed with asbestos graphite rings—nuts are large to accommodate ample size rubber washers. All Double Extra Heavy water gauges have monel metal seats and valve stem loose discs. All extra heavy water gauges have monel metal loose disc valve stem tips. All gauges can be equipped with an attachment which shuts off both water and steam automatically should the gauge glass accidentally break.

For the complete PBH line of Power Plant Equipment and Instruments, send for Bulletin R-34

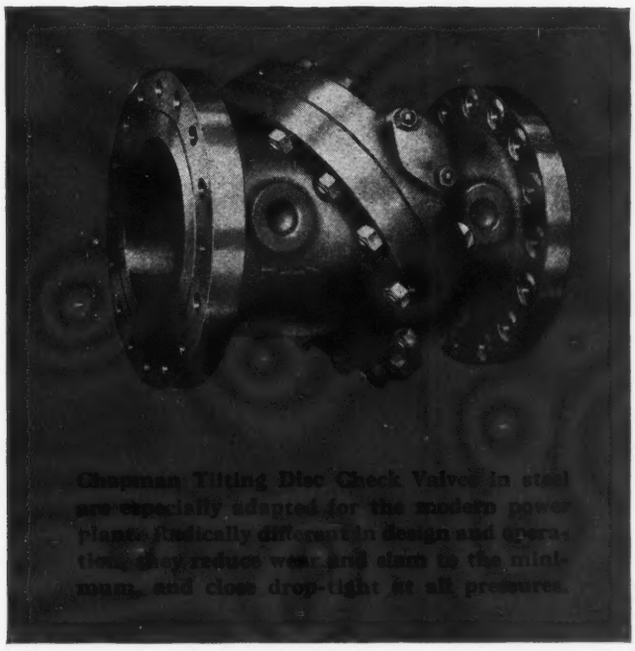
The PAUL B. HUYETTE CO., Inc.
Est. 1896
403 N. Broad St., Philadelphia, Pa.

Chapman Valves

For Power Plant Requirements

Chapman Solid Wedge Steel Gate Valves. Standardized to meet modern power plant needs. Pressures to 1500 pounds. Temperatures to 1000 degrees F. Flanged or welding ends.

Chapman Steel Globe Valves, in carbon steel or alloys to meet specific needs. Ratings for standard lines in carbon steel: 150, 300, 400, 600, 900 and 1500 pounds at 750 degrees F.



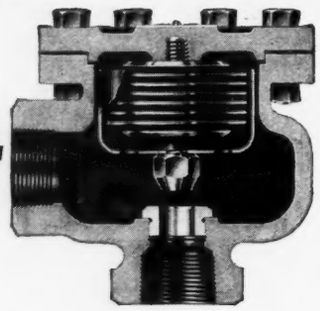
Chapman Tilting Disc Check Valves in steel are especially adapted for the modern power plants, radically different in design and operation. They reduce wear and slam to the minimum, and close drop-tight at all pressures.

The Chapman Motor Unit has many outstanding features. Operation is positive and dependable, due to its rugged construction and simplicity. Jamming is obviated by use of the Chapman micrometer adjusted limit switch.

THE CHAPMAN VALVE

MANUFACTURING COMPANY

INDIAN ORCHARD, MASS.



NICHOLSON

NON-FREEZING, HIGH CAPACITY INDUSTRIAL STEAM TRAPS

These units employ temperature difference between steam and condensate to open and close their valves, a heavy duty thermostatic bellows with brazed end plates being the operating mechanism. They are sturdily constructed and designed for high pressure and severe service. Water and air discharging capacity are extremely high and positive intermittent valve action can be absolutely depended on.

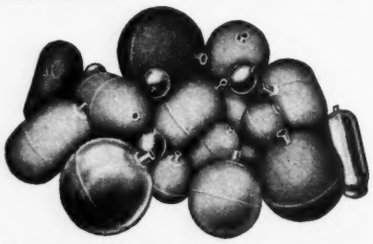
Other advantages include non-freezing, no air binding, dribbling or water-logging.

Available in types and sizes for all services from vacuum up to 300 lbs. with superheat. Ask for bulletin No. 439.

WELDED FLOATS FOR HIGH PRESSURE STEAM AND HYDRAULIC SERVICE

Available in spherical and elliptical shapes in sizes from 2½" to 14" diameter—in stainlesss steel and in chromium plated steel. Made for all steam pressures up to 1500 lbs. and hydrostatic pressures up to 2500 lbs.

"Nicholson" Welded Floats are *die formed*—not spun or laminated—with welding seam serving as reinforcing ring, and give extraordinary resistance to external pressure. Available also with cadimum, nickel or copper plating. Write for Bulletin No. 339 covering details.

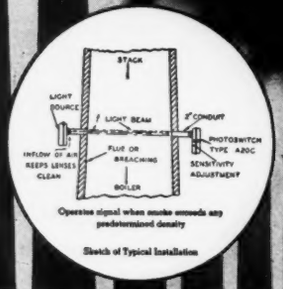


Also: NICHOLSON Control Valves, Piston and Weight Operated Graps, Flexible Couplings Expanding Mandrels, Arbor Presses, Compression Shaft Couplings, Steam Eliminators and Separators, Compressed Air Traps.

W. H. NICHOLSON & COMPANY
WILKES-BARRE PENNSYLVANIA, U.S.A.

PHOTOSWITCH
Electric Eye

INCREASES FUEL ECONOMY—AVOIDS SMOKE NUISANCE



Operates signal when smoke exceeds any predetermined density

Sketch of Typical Installation

DEPENDABLE—RUGGED
• GUARANTEED •

SOLVES YOUR OTHER CONTROL PROBLEMS

Wherever objects are counted, electrical machinery automatically controlled, or warning signals are used, PHOTOSWITCH will do the job better and more economically.

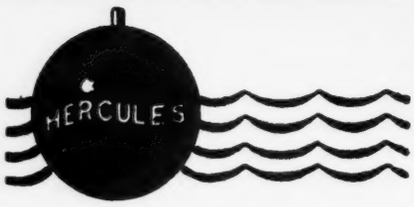
Write for Catalogue.

LOW IN COST

PHOTOSWITCH INCORPORATED
CAMBRIDGE • MASSACHUSETTS

District offices in all principal cities

HERCULES
Seamless Copper
FLOATS



GUARANTEED TO STAND UP!

Every Hercules Float carries our guarantee to stand up under 350 lbs. working pressure and 500 degrees temperature.

Fabricated of seamless copper under our special spinning process, Hercules Floats are uniform in thickness and high in mechanical strength.

You can depend on Hercules for floats—in standard shapes up to 10 in. and in special types to your specifications—to give long, dependable, economical service.

Insure care-free maintenance of water level in your heaters, tanks, reservoirs and other equipment by specifying "HERCULES."

HERCULES FLOAT WORKS
200 Franklin St.
SPRINGFIELD, MASS.

in hose double that of initial steam pressure. From initial steam pressure of 25 to 100 lb, jet pressure of 50 to 200 lb can be obtained. Equipment has 50-gal. boiler-plate solvent tank, and entire unit occupies space 18 x 30 in. *William Sellers & Co, Inc, Philadelphia.*

TOOL POST GRINDER — "All-Purpose" grinder applicable to many different uses, and can be adjusted to any plane or angle. Has eight speeds obtainable by switching pulley and sheave, and standard surface grinder wheels fit spindle either in special or standard thicknesses. Motor and bearings enclosed against dust and dirt, and wick-felt oiler keeps spindle lubricated. *R G Smith Tool & Mfg Co, 245 South St, Newark, N. J.*

RIVET BOLT—Dardelet "Rivet-Bolt" is made of carbon-manganese steel with specially formed button head similar to rivet but with ribbed grip portion slightly greater in diameter than punched and drilled holes in structural-steel connections in which it is used. Rivet-bolt is driven into hole with 7- or 8-lb maul to produce bound fit in the hole. Thread end of unit is formed with Dardelet self-locking screw thread on which nut is turned and tightened. *Dardelet Threadlock Corp, 55 Liberty St, New York, N. Y.*

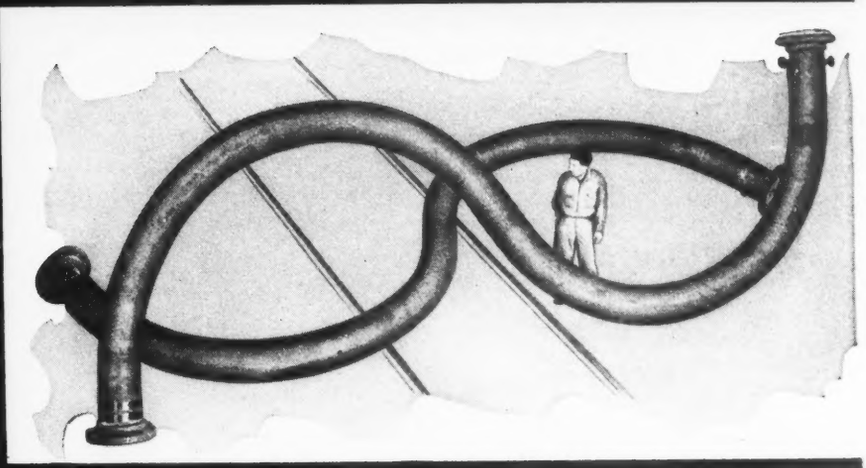
VACUUM ATTACHMENT—"Skraptrap" arrangement collects small objects such as nails, bolt, screws, etc, which have been drawn into portable blower, used as vacuum cleaner. At-

tachment prevents objects from entering and injuring fan blades. Normal dust and lint collected by cleaner passes into bag. *Breuer Electric Mfg Co, 5100 N Ravenswood Ave, Chicago, Ill.*

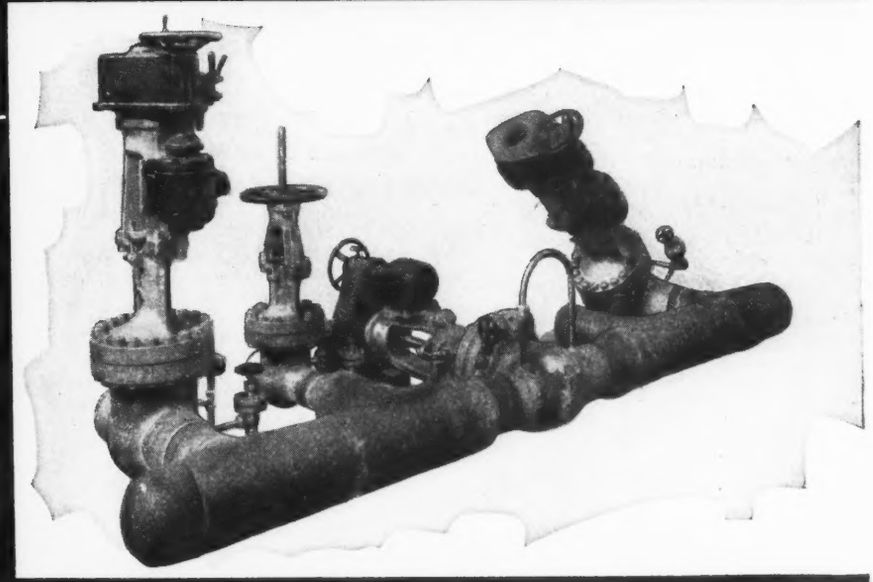
INDICATING MICROMETER—"Compar" indicating micrometer and comparator measures in 0.0001 in. Gears and racks have been elimi-

nated from indicator mechanism in favor of knife-edge lever type. Anvil-relieving button moves back lower anvil for inserting and re-

MIDWEST *Alloy* PIPING



14" O.D. Chromium-Molybdenum pipe bends with Van Stone laps. Entire bends annealed after fabrication.



Carbon-Molybdenum header stress relieved in furnace before welding on valves which were welded by preheating and stress relieving with induction method.

PRESSURE piping users have found that alloy tubing presents many problems and difficulties not encountered when low carbon steel materials are used. Some have learned by bitter experience that the utmost care must be exercised in selecting a fabricator . . . one who has wide experience in the special manufacturing procedures required by the various alloys. It is also essential that the fabricator's welders be skilled on welding alloy tubing . . . and that he have the heat treating furnaces and other special equipment needed.

Each of the three Midwest plants is thoroughly familiar with all the "do's" and "don'ts" peculiar to the fabrication of alloy tubing. Midwest has welders qualified on the alloys . . . and Midwest has the special equipment so essential to the successful fabrication of alloy tubing.

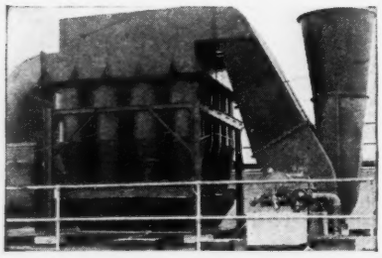
Whenever you need alloy piping, you will find it definitely advantageous to get in touch with the nearest Midwest office.

MIDWEST PIPING & SUPPLY COMPANY, INC.

Main Office: 1450 S. Second Street, St. Louis, Mo.

Plants: St. Louis, Passaic (N. J.) and Los Angeles • *Sales Offices:* Chicago—946 Marquette Building • Houston—1716 Second National Bank Building • Los Angeles—520 Anderson Street • New York—(Eastern Division) 30 Church Street • Tulsa—533 Mayo Building.

THERMIX
Dust Collectors



Variable problems must be met by the proper type of apparatus. There are three types of Thermix Dust Collectors.

Thermix Controlled Multicyclones, for overall mechanical collection at its best, permit only that dust to escape which is of such extreme microscopic fineness that it will travel great distances before reaching the earth. The patented Multicyclone control is vital. Good collection at partial loads can be obtained only by its use, since otherwise the reduced centrifugal force at lower loads reduces collection efficiency.

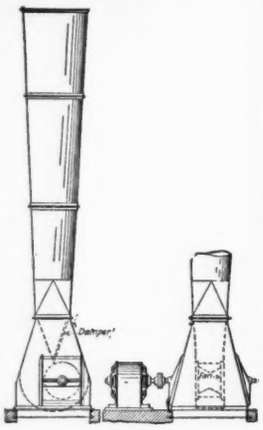
Thermix Tubular Dust Collector offers almost the same remarkable efficiency in the nuisance range, and only slightly less overall collection than the Multicyclone, of which it is one type. Space, cost and weight are at a minimum consistent with sturdy wear resisting apparatus.

Thermix Recirculars—the original skimmer type dust collector—has no draft loss, excellent collection, and may also be used as the I.D. Fan. The space it occupies is little more than a normal I.D. Fan.

Write for catalog.

THERMIX
STACK

It simplifies your induced draft problem by the combination fan, breeching and stack built as a single unit. Overall guarantee, unit responsibility and lowered cost of installation and supports, have caused it to be adopted by many of the modern public utility and industrial plants, both large and small.



Replaceable, bolted-on wearing blades on Thermix fans is an exclusive and patented feature of certain types. Blades are ½" thick at point of greatest wear, reinforced with cast iron, held by lock nuts, replaceable without removing fan from casing, or requiring costly rebalancing. Ten years' use has proved the remarkable value for reduction in fan maintenance costs.

Write for catalog on Thermix Stacks.

PRAT-DANIEL CORPORATION
88 So. Water St. Port Chester, N. Y.

moving work. When work is inserted and button released, anvil is pressed against work by light-pressure return spring, thereby insuring consistency of measurement. *George Scherr Co, 128 Lafayette St, New York, N. Y.*

TENSION-MEASURING WRENCHES—Snap-on "Torqometers" said to eliminate distortion, improve performance, and minimize wear. Predetermined leverage measures deflection of solid steel bar, indicating such on dial, reading remaining constant. Tool comes in 6 sizes, for use in several industries. Scale measurements range from 0 to 1500 ft lbs. Dial can be set in advance to tension reading, and all nuts or bolts tightened until required tension is reached. *Snap-on Tools Corp, Kenosha, Wis.*

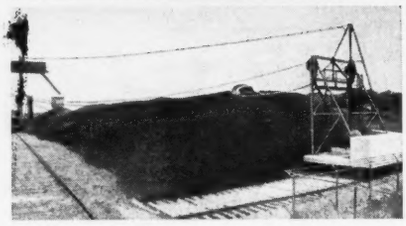
TORQUE-INDICATING WRENCH—No. 59 is constructed of heavy, ground, spring-steel shaft with pointer which remains rigid. Even tension on belts and studs obtained by pulling on handle grip, which bends spring steel shaft. Scale, calibrated from 0 to 200 ft lb is on shaft near handle grip and moves under pointer as pull is exerted on shaft. Permanently equipped with ½-in. square reflector and can be used with all ½-in. square-drive sockets and attachments. Weighs 3 lb and over-all length is 23 in. *Bonney Forge & Tool Works, Allentown, Pa.*

Current Comment

Looking at the Record—The Producer-Gas Engine

DEVELOPMENT OF THE PRODUCER-GAS ENGINE has been slow during the past 25 years, but it would seem wise to weigh carefully the possibilities of this engine before giving too much thought to the coal-dust-engine—the alternative method of utilizing solid-fuel in an internal-combustion engine. Producer-gas engines have several advantages: ashes may be removed readily, refuse may be used as fuel, and there remains the possibility of bleeding

STORE AND RECLAIM COAL WITH THE COST REDUCING
SAUERMAN
POWER DRAG
SCRAPERS



LOW COST
—low initial cost of equipment. One unit for both storing and reclaiming. Low cost of installation, operation, and maintenance.

SIMPLICITY
—easy to install—no elaborate structure. Easy to operate—no skilled labor. Easy to maintain—wearing parts few and all are accessible. Uses electric, steam, gasoline, fuel oil, or belt power.

FLEXIBILITY
—storage area may be any shape. All material stored is reclaimed with equal facility.

DEPENDABILITY
—can be relied upon for continuous service. Any man can operate it and take care of the occasional replacement of cables and sheaves.

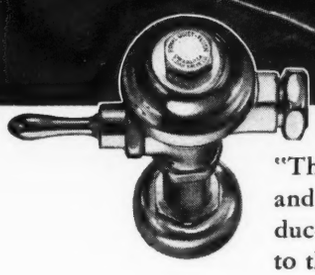
CLEAN HANDLING
—Sauerman Crescent Scraper loads quickly and when loaded it "floats" across the surface of the pile. Because of the shape of the scraper a steady pressure is exerted toward the center so that the load is held compactly in place.

FIRE HAZARD OVERCOME
—scraper stores coal in well packed layers and thus is able to build a pile of any height free of voids or air pockets, eliminating the danger of spontaneous combustion.

SIZES
—there is a size of Sauerman Drag Scraper System to suit the requirements of every coal storage project and all Sauerman installations from the smallest to the largest, offer low-cost results.

Write for Catalog No. 15

SAUERMAN BROS., Inc.
462 S. Clinton St.
CHICAGO, ILLINOIS



"These few elements, easily and readily installed, will reduce the roar of flush valves to the merest whisper.

"Now, this is not just a 'muffling device.' Here is a brand new principle put to work which makes any Sloan Royal, Star, Crown or Naval valve not only absolutely quiet, but virtually a new installation. Here is a completely re-designed throttling valve, a new guide and seat—all exclusively Sloan. These elements don't screen the water because screens will clog. But they make a monel metal mesh *cushion* the water, and it is this cushioning action which quiets the roar—reduces the noise of flush valve operation to a murmur. And as I said before—any master plumber can install the Sloan *Quiet-Flush* equipment in a few minutes."

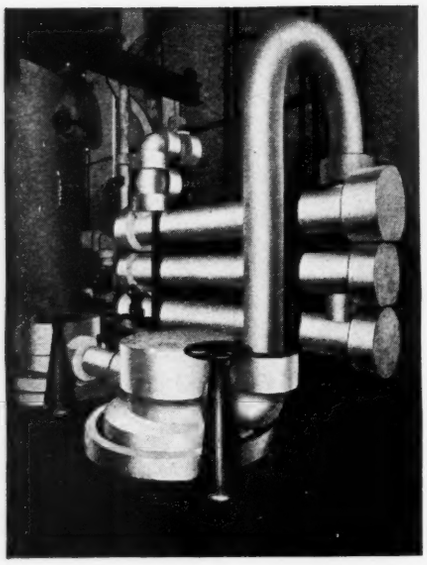
In hotels, apartments, hospitals and many office buildings quiet is an absolute essential. But, unfortunately, flush valve roar frequently penetrates walls, or telegraphs itself from floor to floor. *That's* what makes it so annoying. Correct this now. Send today for a copy of our new folder "Silent Nights" which explains in detail the principle of Sloan *Quiet-Flush* equipment and how you can get a single unit for trial and proof in your own building.

Send No Money to Hush That Noise

Send us your name, connection and address, and we will rush folder explaining this new boon to Silent Nights—how you can easily apply it to your present fixtures at very little cost.

SLOAN VALVE COMPANY • CHICAGO
4300 WEST LAKE STREET

SLOAN *Quiet Flush* VALVES



If it's

BOILER WATER CONCENTRATION CONTROL

you want . . .

THE ANSWER IS HENSZEY CONTINUOUS BLOWDOWN

Here's what it is . . .

The Henszey Continuous Blowdown system consists mainly of either a two stage temperature exchanger or a combination of flash tank and low temperature exchanger—a Flow Indicator—a Blowdown Meter, and a Proportioning Valve.

Here's what it does . . .

This remarkable system eliminates scale, priming, foaming, and carry-over, by simply drawing off the accumulated impurities at a rate that keeps the boiler water concentration at a pre-determined proper degree. This is done continuously, automatically and without heat loss!

Send for literature

HENSZEY COMPANY
Dept. D12A Watertown, Wis.

HENSZEY

BOILER WATER CONCENTRATION CONTROL SYSTEMS

gas for heating and industrial purposes, as a substitute for steam or hot water.

Nothing prevents raising the mechanical efficiency of the producer-gas engine from an average of 70% to 80 or 85%. It would be a good idea to abandon the suction type of plant entirely and to force the gas to the engine in some way or another. The writer has observed that pre-ignition troubles occur during periods of extra-low volumetric efficiency, due to an abnormally high percentage of ashes in the producer. Then the gas is very lean and trouble is caused by slow-burning conditions of the cylinders.

Reducing the dimensions of the gas producer will lead to lower standby losses because it is highly impractical to store a mass of fuel above a relatively thin combustion and gasification zone. In order to build a cheap engine we should go to high-speed multi-cylinder motors with easily standardized and readily obtainable parts. It should be possible to beat the records of 35 years back and attain day after day the test-floor figure of 0.75 lb. instead of 1.25 per bhphr.

Uitgeest, Holland H WIELAND LOS

More on Bleeder-Turbine Heat Rate

THE SIMPLE METHOD of calculating bleeder-turbine heat rate developed by Gottlieb and Gove in March POWER and commented on by Professor Greene in September is valuable and timely. However, there seems to me to be a bit more that will bear discussion in this heat-rate problem.

The average practicing engineer really wants to know how much power is developed from bleed steam as distinct from the amount that is made in the entire turbine by steam that ultimately goes to the condenser. This is especially true when segregation of power and process steam costs is wanted.

In the example under dicussion, the heat converted into work in the high-pressure end of the turbine is 127.8 Btu per lb, and in the complete turbine, 277.5 Btu per lb. Using these figures and the corresponding flows, the power developed bleeding is found to be 1420 kw and the condensing power is 1580 kw, totalling 3000 kw as in the original case.

Moreover, the average heat rate of 9970 Btu per kwhr, as given for Case I of the example, is correct only if the 40,000 lb of bleed steam and the 20,500 lb of condensate are returned to the boilers with a heat content of 69.1 Btu per lb. The heat rate of Case II is only correct if the condensate or makeup is returned at 212 Btu per lb.

Care should be used in problems of this nature to define all the circumstances, as the error in the above case due to assuming 212-Btu makeup for Case I instead of 69.1 would have been of the order of 5%. Breaking down the problem into generation by bleed steam and by condenser steam through the entire unit requires little if any more work and gives a clear picture of the real heat rate for process and for condensing.

Raleigh, N. C. F C DEWEESE

BUSINESS ITEMS

CUTLER-HAMMER, INC, Milwaukee, Wis, has appointed H E Ankeney 307 N Pennsylvania Ave, to take charge of the company's Indianapolis territory.

ACOUSTIC DIV OF BURGESS BATTERY CO has made S G Paddock local representative in Tulsa, Okla. Mr Paddock will work in cooperation with the Burgess sales representative, Diesel Service Co, Ames, Iowa, and local dealers The Laney Co and Diesel Supply Co of Tulsa.

WALTER KIDDE & CO, makers of carbon-dioxide fire-extinguishing equipment, Bloomfield, N. J., have started work on a new 3-story building scheduled for completion in April, 1940. The addition, to be devoted exclusively to engineering and research work, will house 110 engineers and will add 20,000 sq ft to the company's working space.

A P GREEN FIRE BRICK CO, Mexico, Mo., has appointed Bradshaw & Co, 530 4th Ave, Pittsburgh, Pa., as local representative.

ALLEN-BRADLEY CO, Milwaukee, Wis., has appointed two new factory representatives to serve several midwestern states. In Oklahoma and Arkansas, Paul Berry, 3128 NW 26th St, Oklahoma City, Okla., will handle the Allen-Bradley line. A V Sorensen, operating as the Midwest Equipment Co, 1206 Farnam St, Omaha, will represent the Allen-Bradley in Nebraska and western Iowa.

D W HAERING & CO, 3408 W Monroe St, Chicago, Ill., announce following changes and additions in personnel and offices: Preston L Plews, formerly with Henry Vogt Machine Co and Vilter Mfg Co, has been appointed district manager in charge of the New York office at 159 E 34th St. Laboratory facilities have been installed. Neville Row has been promoted to position of district manager of Minneapolis, Minn., office in Plymouth Bldg, Rm 1126. Detroit office has been moved to 7310 Woodward Ave, Nashville, Tenn., office has been moved to 129 2nd Ave, with Guy Hamilton in charge. R E Turner and J B Schroeder have been placed in charge of the new Philadelphia office and the tri-city area operating from Cincinnati, Ohio, respectively. Hiram C Daggett has been appointed manager of Buffalo office recently opened at 715 Brisbane St. W B White is now in charge of Cleveland territory operating from 13910 Woodworth Rd.

Texas Safety Record

Completion of one year with no lost-time accidents in any of the nine generating plants of Texas Power and Light Co has just been announced by president John W Carpenter. This record was made by an average daily personnel of 275 and aggregated more than 570,000 hours.

Edward T Keck is vice-president in charge of Power and Engineering, Norman G Hardy is superintendent of Power, and Carl J Rutland is Safety Director.

THE COMPLETE LUNKENHEIMER LINE

Immediately Available

From Distributors Conveniently Located to Serve You

VALVES

Bronze, Iron, Steel and Corrosion-Resistant Alloy; Globe, Angle, Cross, Check, Gate, Throttle, Non-return, Blow-off, Pop Safety, Relief, Whistle, etc.

OIL AND GREASE CUPS

Glass, Bronze or Aluminum Body Oil Cups; Bottle Oilers; Constant Level Oil Controls; "Glaswick" Oil Cups; Automatic or Screw Feed Bronze Grease Cups.

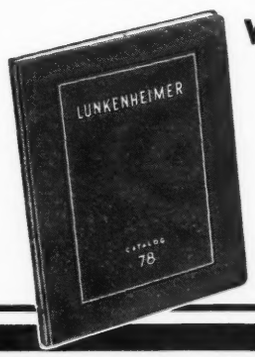
BOILER MOUNTINGS

Non - return, Pop Safety and Blow - off Valves; Water Columns, Water Gauges and Gauge Cocks; Fusible Plugs.

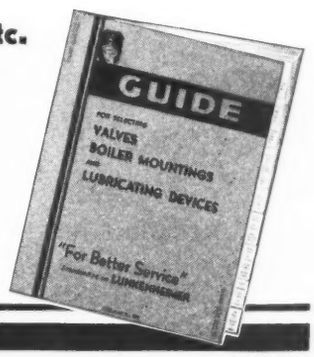
LUBRICATORS

For Steam, Gas, Gasoline, Oil Compressor and Pump Cylinders; Gravity Feed or Hydrostatic.

Whistles, Cocks, Fittings, Unions, Air Nozzles, Etc.



Lunkenheimer Catalog 78 describes and lists the complete Lunkenheimer line. The Guide is a ready reference for selecting Valves, Boiler Mountings and Lubricating Devices in which products are grouped by pressure, type and use. Ask your local Lunkenheimer distributor for copies or write us direct.



THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI, OHIO, U. S. A.
NEW YORK CHICAGO
BOSTON PHILADELPHIA
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK

28-55C-42

A glimpse into the world's largest turbine workshop

THE FORGE SHOP

CAPABLE of a 1,200,000-pound blow on a hot forging, this 12,000-pound hammer serves in the General Electric turbine workshop to produce sound forgings for G-E turbines. Your glimpse of operations loses only by the absence of motion as this well-trained crew of forgemen swing and turn the hot steel for the hammer.

Such parts as the turbine shaft and wheels and the generator rotor and retaining rings are machined from steel forgings to withstand the high speeds and accompanying stresses encountered in operation. Careful supervision and control of the forging assure sound material to meet these severe service conditions.

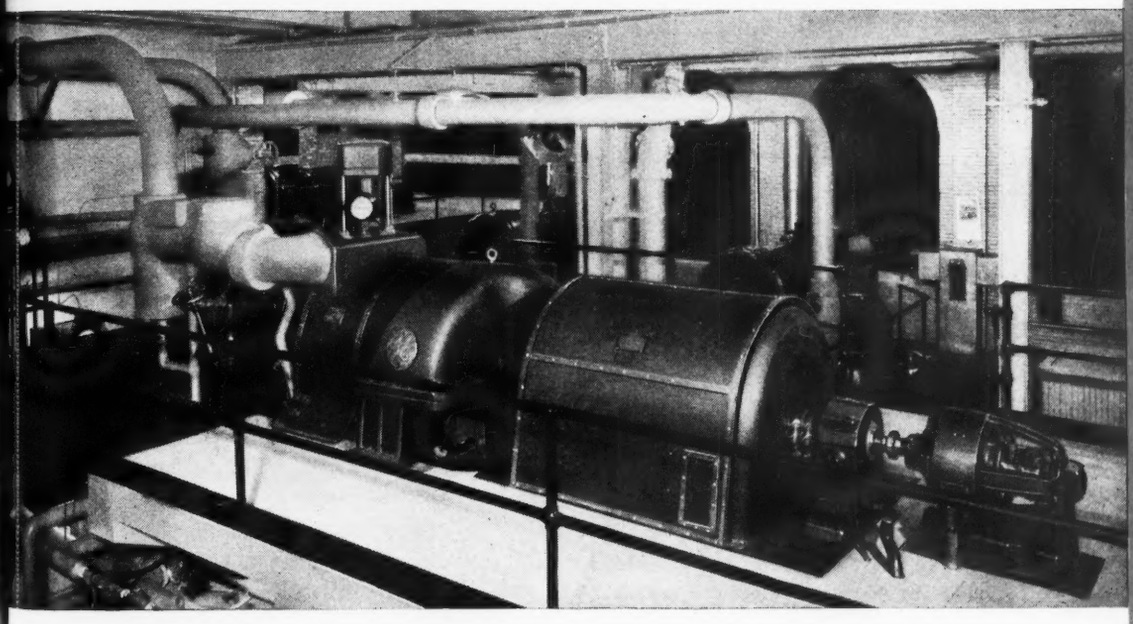
Our knowledge of forging operations, gained through long experience in the forge shop, results in twofold benefits. Forgings produced in the G-E shops are of sound, uniform quality; and special forgings obtained from other manufacturers can be scrutinized rigidly on the basis of this experience. This knowledge of the problems involved and the results to be expected is a highly valuable asset.

Yet this is just one of the ways in which General Electric engineers combine the results of progressive design with sound methods of manufacturing. There are many others. The benefits of such a policy are clearly shown by the performance records of G-E turbines.

GENERAL

For Results Like This!

Seven Years of SERVICE
59,943 Operating Hours
39,629,290 Kilowatt-hours
Renewal Parts Used—NONE



This 1500-kw G-E turbine-generator has an unusual record for continuous, low-cost service

For more than seven years this G-E turbine-generator has been operating on a schedule of 24 hours a day, seven days a week. During that time the generator has been on the line, delivering power, more than 99 per cent of the time. Renewal parts were purchased as a matter of good policy, but have not been used.

We believe that performance like this will interest you. The turbine specialist at the nearest G-E office can give you other similar examples of G-E turbine service. He can assist you in selecting the correct turbine equipment for your plant. General Electric, Schenectady, New York.

ATTENTION, POWER ENGINEERS

The new G-E diactor generator - voltage regulators are topping the performance of the popular Type GDA units. In the short time since these regulators were introduced, users have already noticed the differences.

Fewer moving parts, stronger and lighter construction, faster action, and a new fully enclosed design to prevent the entrance of dust and dirt are some of the improvements that have made better performance possible. All Diactor regulators have the same quick-action, wide-range rheostatic element that made Type GDA regulators such outstanding performers.

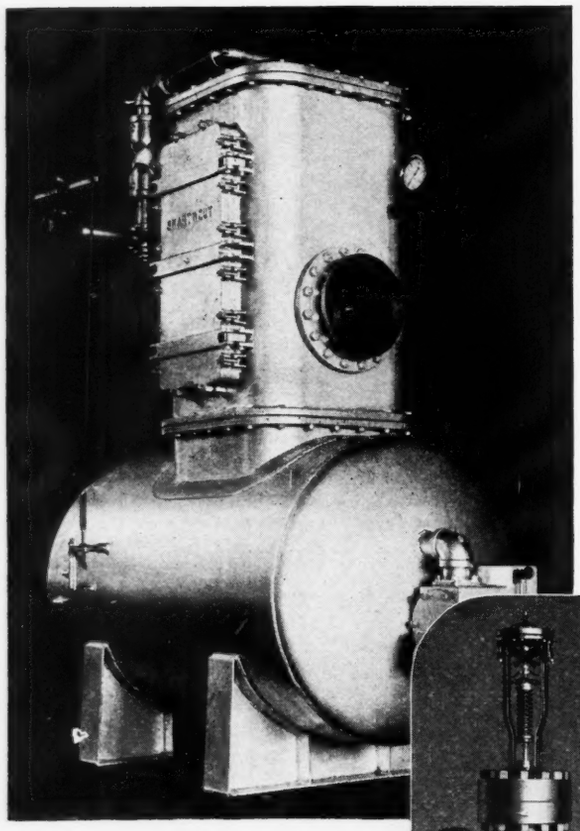
A specialist in the nearest General Electric office can give you detailed information about this complete line of regulators for small and medium-sized machines. Or write for Bulletin GEA-2022C. General Electric, Schenectady, N. Y.

710-208

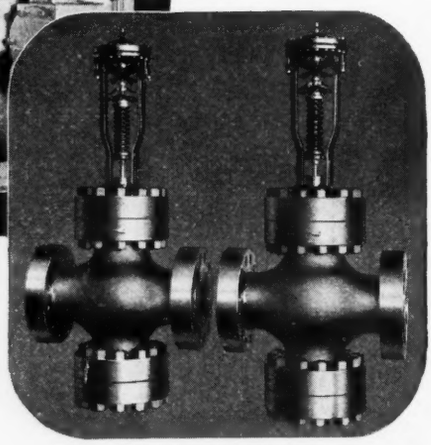
GENERAL ELECTRIC

You're Dollars Ahead

with these three Swartwout Controls in your Power Plant



Swartwout Heater in Marshall Field & Company plant, Draper, North Carolina — another unit tailored to meet customer's requirements.



Swartwout Feed Water Regulators in use at Columbus & Southern Ohio Electric Company, Columbus, Ohio — 1350 pounds operating pressure.

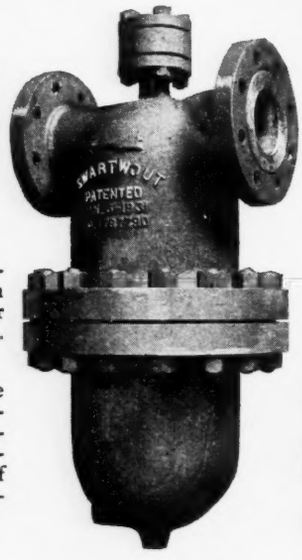
Continuous, Adequate Feed Water Heating

Avoid the two most costly and troublesome threats to your efficient profitable operation of your power plant — uncertain control of boiler water supply and water levels. For the first, Swartwout Deaerating Feed Water Heaters assure you a constant supply of oxygen-free correct temperature water. Each heater is designed to meet your specific requirements. Rugged construction, highest grade accessories — *guaranteed trouble-free results at reasonable cost,* as hundreds of fortunate power engineers can tell you from actual experience. . . . Then —

Sensitive, Dependable Feed Water Regulation

It's assured by the Swartwout "S-C" Feed Water Regulator — a simple positive system, easy to install, at moderate expense. The famous "S-C" principle and Swartwout's careful manufacturing make for lower installation, operating, and maintenance costs.

Swartwout Feed Water Regulators take the worry out of water level control. . . . Lastly —



Swartwout Desuperheaters are made in both venturi and carburetor types, in 2" to 24" sizes.

More than 34 years active experience in this field equips Swartwout to maintain its excellent reputation with thousands of satisfied users of Swartwout power plant equipment.

Positive, Controlled Desuperheating . . . Preparing steam for various processes or power production is achieved with safety and kept under rigid control by Swartwout Reducing and Desuperheating Stations. Complete equipment designed, built and serviced by Swartwout — a *unified* responsibility you can depend upon for performance that enhances your standing as a power plant engineer. • *You're dollars ahead with Swartwout Controls assuring greater safety and efficiency and lower costs. Write today for free bulletins and complete information.*

The Swartwout Company • 18501 Euclid Avenue • Cleveland, Ohio

Feed Water Regulators • Pump Governors • Feed Water Heaters
Master Controls • Reducing Valves • Separators • Exhaust Heads

Swartwout

•Power Plant Equipment•

CONSISTENT UNIFORMITY IN SERVICE

You can depend on Youngstown Steel Pipe for fast installations because Youngstown Pipe is uniform in strength and workability.

That's because we make pipe with accurate control.... have a most severe inspection system .... and thoroughly check all details.

Youngstown Steel Pipe is uniformly tough, and precision-built -- -- which makes it easier for you to use, saves your time, helps you do a better job!

★

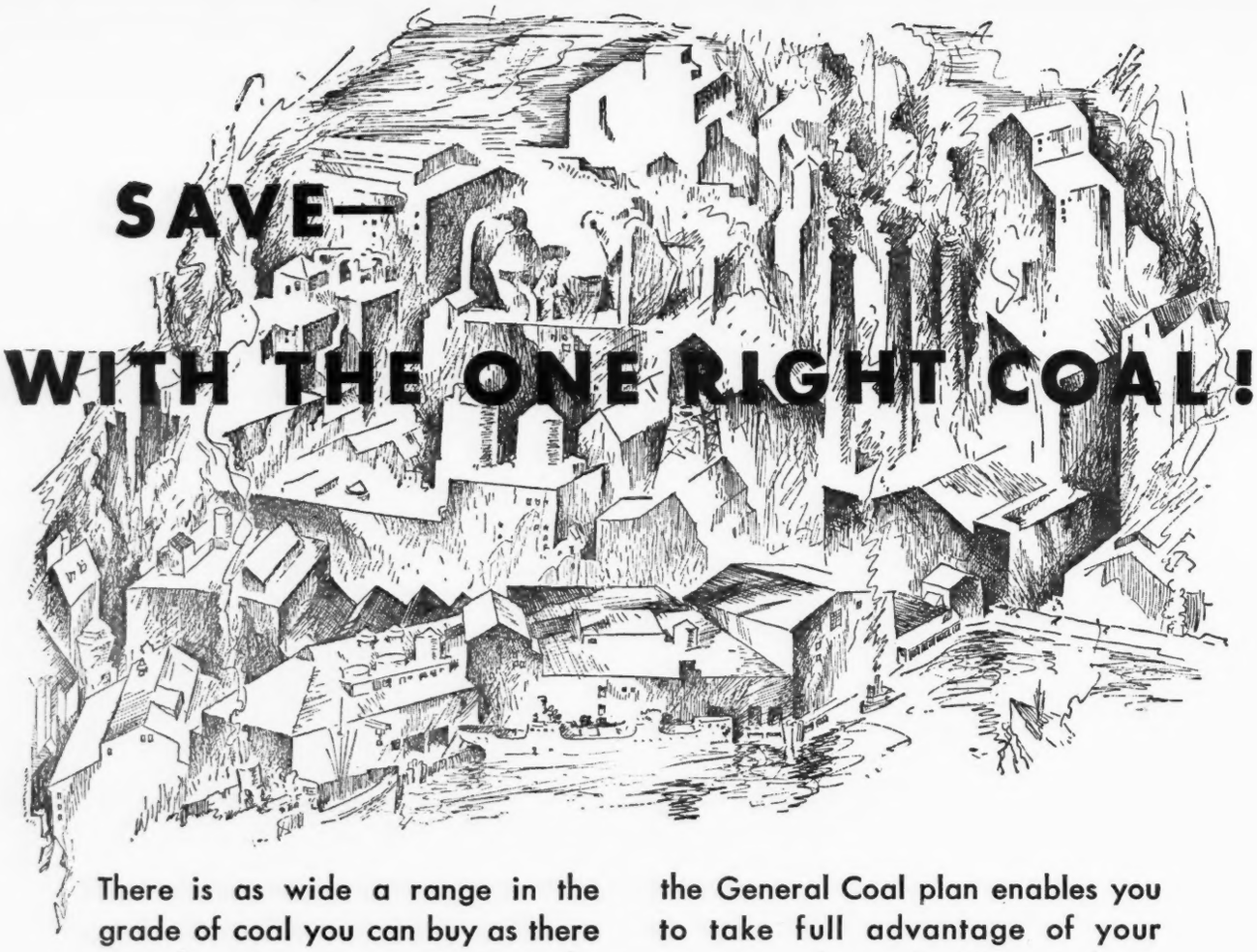
Ask your distributor for Youngstown Pipe and Tubular Products - Tin Plate - Sheets - Plates - Conduit - Bars - Rods - Wire - Nails - Tie Plates and Spikes. 19-7B

STEEL TRADE MARK YOUNGSTOWN PIPE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO



SAVE— WITH THE ONE RIGHT COAL!

There is as wide a range in the grade of coal you can buy as there is in the price you pay for it or the service you get. But fuel of inferior grades, with inadequate service are unnecessary evils if you are a General Coal Company customer.

The General Coal Company offers the power field a coal to fit every purpose and every analysis requirement. Everything else being equal, the General Coal plan enables you to take full advantage of your power producing facilities. A diversity of fuel requirements can be covered from a centralized source of supply.

Each General Coal brand stands for the utmost in that particular analysis. Strategic location to your plant means the efficient and expeditious filling of your contract requirements.

GENERAL COAL COMPANY

PHILADELPHIA, PA.

BOSTON CHARLOTTE, N. C. DETROIT CINCINNATI NEW YORK CHARLESTON, S. C. PITTSBURGH BUFFALO IRWIN, PA.

GENERAL COAL

Admiralty Coal · DENDRON · GENCO · PREMIX STOKER · STONEGA · RODA · DEPENDABLE ANTHRACITE · CROZER · CRITERION COAL

Make a mental note of what you require in a valve for your particular work and compare it with what we say of Darling, and then ask any user how nearly right you will be in equipping throughout with DARLINGS.

LONG WEARING
EASY OPERATING
QUICK REPAIR
LOW ULTIMATE COST

DARLING VALVE & MFG. CO.
WILLIAMSPORT, PA.

Representatives in:

NEW YORK OKLAHOMA CITY HOUSTON
PHILADELPHIA PITTSBURGH TOLEDO
EVANSTON, ILL.

DARLING

GATE VALVES
FIRE HYDRANTS

If a Rope of Gold would cost you less

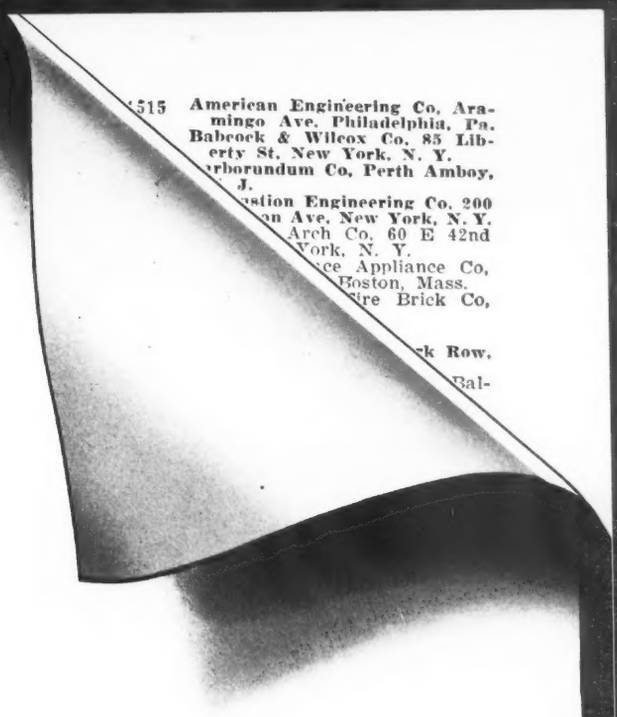
we'd recommend it

The price-per-foot of wire rope means little to the rope user. It's the price-per-unit-of-use that determines the actual cost of wire rope. If a rope made of gold would show lower use costs, it would be a real economical selection. Real economy for the user is the basis of all recommendations by Wickwire for both Regular Lay and Wisscolay Preformed Wire Ropes. While the purchase price of Wickwire Rope is no higher than that of other recognized brands, users who change to Wickwire Rope usually find that their price-per-unit-of-use goes down. Wickwire Rope lives longer . . . use it yourself and note the difference.

WICKWIRE ROPE

WICKWIRE SPENCER STEEL COMPANY

General Offices: 500 Fifth Avenue, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City


515 American Engineering Co, Aramingo Ave, Philadelphia, Pa.
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
rborundum Co, Perth Amboy, J.
stion Engineering Co, 200 n Ave, New York, N. Y.
Arch Co, 60 E 42nd York, N. Y.
ce Appliance Co, Boston, Mass.
ire Brick Co,
k Row,
Bal-

POWER

1940 DIRECTORY OF MANUFACTURERS

A Buyers' Guide of over 400 power products, and who makes each

How to use this directory—Look for the noun in the product name, for example: "Strainers, oil", not "Oil strainers"; "Accumulators, steam", not "Steam accumulators". The directory is freely cross-indexed to help locate the item you are looking for

Company names are classified alphabetically; those advertising in POWER are listed in bold-face type and are indexed on the following two pages. Actual product listings start on page 158

Advertisers' Index

When an * appears after a name the advertisement does not appear in this issue but appeared in preceding issues.

Acme Visible Records..... *
Airetool Mfg. Co.....230
Air-Maze Corp..... *
Allen-Sherman-Hoff ..... *
Allis-Chalmers Mfg. Co., 11, 105, 107, 254
American Blower Corp..... *
American Brass Co.....113
American Chimney Corp..... *
American Chain & Cable Co....28–29
American District Steam Co.....228
American Engineering Co.....38–39
American Locomotive Co.....224
American Metal Hose Branch....113
American Pulverizer Co.....171
American Radiator & Standard Sanitary Corp. ..... *
American Sand-Banum Co.....213
Anderson Co., V. D.....229
Armstrong Machine Works....182, 195 203, 204
Arrowhead Iron Works..... *
Atlas Valve Co.....208

Babbitt Steam Specialty Co.....136
Babcock & Wilcox Co.....4–5
Bailey Meter Co.....12–13
Baldwin-Hill Co.....183
Bartlett Hayward Div..... *
Beaver Pipe Tools.....169
Belmont Packing & Rubber Co..... *
Bendix Aviation Corp..... *
Best Engineering Co., W. N.....163
Betz, W. H. & L. D.....212
Biddle Co., James G..... *
Blackmer Pump Co..... *
Blaw-Knox Co. ..... *
Boiler Tube Co. of America.....226
Borg Warner Corp.....Third Cover
Botfield Refractories Co.....164
Brassert & Co., H. A..... *
Brownell Co..... *
Brown Instrument Co.....48–49 176, 185, 194, 201
Buckeye Machine Co..... *
Buell Engineering Co..... *
Buffalo Forge Co.....233
Buffalo Pumps..... *
Builders Iron Foundry.....185
Burgess Battery Co..... *
Burlington Instrument Co.....195
Bussman Mfg. Co..... *
Byers Co., A. M..... 54

Calgon, Inc. ..... *
Canton Stoker Corp.....199
Carborundum Co..... *
Carey Co., Philip.....Back Cover
Cash Co., A. W..... 34
Centrifix Corp.....193
Chaplin Fulton Mfg. Co.....213
Chapman Valve Mfg. Co.....141
Chase Brass & Copper Co..... *
Chicago Bridge & Iron Co..... *
Chicago Metal Hose Corp.....134
Chicago Pneumatic Tool Co..... *
Cities Service Oil Co..... *
Clarage Fan Co....158, 160, 174, 181
Cochrane Corp.....180, 185, 198, 204
Columbia Casualty Co..... 25
Columbia Electric Mfg. Co..... *
Combustioneer Division Steel Products Engineering Corp.....226
Combustion Engineering Co.....46–47
Condenser Service & Engineering Co. ..... *
Connery Construction Co.....162
Controlled Steam Generators..... *
Cook Mfg. Co., C. Lee..... *
Coppus Engineering Corp..... 22
Corning Glass Works..... *
Crane Co..... 33
Crocker-Wheeler Electric Mfg. Co. *
Cutler-Hammer, Inc. 99
Cutshall & Sons, J. M.....163

Dampney Co. of America..... *
Darling Valve & Mfg. Co.....153
Dart Mfg. Co., E. M..... *
Davis Regulator Co.....196, 197, 210
Dearborn Chemical Co..... 23
De Laval Separator Co..... *
De Laval Steam Turbine Co...50, 193
Deming Co..... *
Detroit Stoker Co..... 27
De Wolf Furnace Corp.....159
Diamond Power Specialty Corp....8–9
Dixon Crucible Co., Joseph.....178
Dorex Air Conditioning Div. W. B. Connor Engineering Corp..... *

Eagle Picher Lead Co..... *
Eddington Metal Specialties..186, 193
Edge Moor Iron Works.....232
Edward Valve & Mfg. Co.....103
Electric Machinery Mfg. Co..... 17
Electric Storage Battery Co.....123
Elgin Softener Corp..... *
Elliott Co. 6–7
Engineer Co. 159, 163, 190
Equipment Engineering Co..... *
Erie Electric Co.....202
Eureka Packing Co.....188

Fairbanks Co. 136
Fedders Mfg. Co..... *
Fisher Governor Co..... *
Flexible Metal Hose & Tubing Institute ..... *
Flexrock Co.....213
Flynn & Emrich Co..... *
Foster Engineering Co..... *
Foster Wheeler Corp..... 40
Foxboro Company..... *
France Packing Co..... *
Frick Company..... *
Fuller Company.....139
Fulton Sylphon Co.....197

Gardner-Denver Co..... *
Garlock Packing Co.....30, 187
General Coal Co.....152
General Electric Co....44–45, 148–149
Gilmer Co., L. H.....159
Globe Steel Tubes Co..... *
Goetze Gasket & Packing Co.....176
Golden-Anderson Valve Specialty Co. 130
Goodyear Tire & Rubber Co..... *
Graver Tank & Mfg. Co..... *
Graybar Electric Co.....166, 180, 186 199, 200, 210, 212
Greene Tweed & Co.....220
Grinnell Co. 21
Gulf Oil Corporation.....135
Gulf Refining Co.....135

Hagan Corporation.....18–19
Hall Laboratories..... *
Hamilton Co., E. A..... *
Hardie Made-Rite Boiler Plug Co..189
Harrisburg Steel Corp..... *
Harrison Radiator Div..... *
Haynes Stellite Co..... *
Hays Corp. ..... *
Henszey Co.....140, 146
Hercules Float Works.....142
Hilliard Corp..... *
Hoffman Specialty Co..... *
Homestead Valve Mfg. Co.....214
Hunter Pressed Steel Co.....179
Huyette Co., Paul B.....140

Ingersoll-Rand Co. 36–37
Inland Fire Brick Co. 228
International Heating & Ventilating Exposition ..... *
International Nickel Co. 20, 129
Iron Fireman Mfg. Co. 115

Jarecki Mfg. Co. 213
Jefferson Union Co. 205
Jenkins Bros. 108–109
Johns-Manville 42–43
Johnson Service Co. ..... *
Johnston & Jennings Co. ..... *
Jones & Laughlin Steel Corp. 121
Jones Foundry & Machine Co., W. A. *

Keasbey & Mattison Co. 24
Keeler Co., E. ..... *
Kellogg Co., M. W. 10
Kennedy Valve Mfg. Co. 219
Kidde & Co., Walter ..... *
Koppers Coal Co. ..... *
Koppers Co. ..... *

Laclede Stoker Co. 199
Laminated Shim Co. ..... *
Leavitt Machine Co. 132
Leeds & Northrup Co. ....Second Cover 168, 176, 184, 194, 195, 202
Leitch Co., Arthur S. ..... *
Lincoln Electric Co. ..... *
Linde Air Products Co., The 35
Link-Belt Co. 3
Lunkenheimer Co. 147

Macmillan Petroleum Corp. ..... *
Manhattan Rubber Mfg. Division Raybestos-Manhattan, Inc. ..... *
Manzel Brothers Co. ..... *
Marley Co. 117
Marlo Co. 189
Mason-Neilan Regulator Co. ..... *
Master Metal Spray Co. ..... *
Maxim Silencer Co. ..... *
McGraw-Hill Book Co. ..... *
McNeill Engineering Equipment, T. W. ..... *
Midwest Piping & Supply Co. 143
Monitor Controller Co. ..... *
Minneapolis-Honeywell Regulator Co. 48–49, 176, 185, 194, 201
Monsanto Chemical Co. 211
Moore Steam Turbine Corp. ..... *
Morse Chain Co. .....Third Cover
Murray Iron Works Co. 231
Murray Mfg. Co., D. J. ..... *

National Airoil Burner Co. 164
National Aluminate Corp. 160, 172 202, 212
National Engineering Products ...177
National Supply Co. 227
National Tube Co. ..... *
National Valve & Mfg. Co. 225
Naugatuck Mfg. Co. 228
Nicholson & Co., W. H. 142
Nordberg Mfg. Co. ..... *
Northern Equipment Co. 111

Oakite Products 230
Ocean Accident & Guarantee Corp. 25

Pacific Pump Works ..... *
Peale, Peacock & Kerr ..... *
Pennsylvania Pump & Compressor Co. 222
Permutit Co. ..... *
Philadelphia Gear Works 125
Photoswitch Inc. 142
Pickering Governor Co. 177
Pipe Fabrication Institute ..... *
Pittsburgh Coal Co. ..... *

Pittsburgh Piping & Equipment Co. 31
Porter & Co., H. W. 205
Powell Co., Wm. 127
Power Piping Division ..... *
Power Service Section 228
Prat Daniel Corp. 144
Pure Oil Co. 228

Quimby Pump Co. 190

Reading Pratt & Cady Div. 28–29
Reeves Pulley Co. ..... *
Reliance Electric & Engineering Co. *
Reliance Gauge Column Co. 133
Republic Flow Meters Co. 167, 170, 184, 209
Republic Rubber Div. ..... *
Republic Steel Corp. 41
Research Corp. ..... *
Rhoads & Sons, J. E. ..... *
Richardson Scale Co. ..... *
Ric-Wil Co. ..... *
Riley Stoker Corp. 92–93
Robins Conveying Belt Co. ..... *
Rockwell Co., W. S. 136
Roebling's Sons Co., John A. 215
Roto Company ..... *

Sarco Company ..... *
Sauerman Bros. 144
Scaife & Sons Co., Wm. B. ..... *
Schramm Inc. 166
Scovill Mfg. Co. ..... *
Searchlight Section 235–253
Sea-Ro Packing Co. ..... *
Shaw Co., Benjamin F. 191
Shell Oil Co., Inc. ..... *
Simplex Valve & Meter Co. 134
Skinner Engine Co. 173
Sloan Valve Co. 145
Smith Refractories Co., Sanford C. .228
Smooth-On Mfg. Co. ..... *
Snap-on Tools Corp. ..... *
Socony-Vacuum Oil Co. ..... *
Springfield Boiler Co. ..... *
Squires Co., C. E. 217
Standard Oil Co. of California 32
Standard Oil Co. (Indiana) ..... *
Standard Pressed Steel Co. 179
Staynew Filter Corp. 131
Steel & Tubes 41
Stephens-Adamson Mfg. Co. ..... *
Sterling Engine Co. ..... *
Stickle Steam Specialties Co. ..... *

Straight Line Foundry & Machine Corp. 198
Strong, Carlisle & Hammond Co. .. *
Sturtevant Co., B. F. 14–15
Superheat Control Corp. 200, 216
Superior Diesel Engine Division 227
Swartwout Co. 150

Taylor Forge & Pipe Works ..... *
Taylor Instrument Co's. 223
Tejax Engineering Corp. 182
Terry Steam Turbine Co. ..... *
Texas Company 26
Thurmalox Co. 163
Tide Water Associated Oil Co. .... *
Timken Roller Bearing Co. ..... *
Todd Combustion Equipment ..... *
Toledo Pipe Threading Machine Co. *
Trico Fuse Mfg. Co. ..... *
Tripp Metallic Packing Co. 228
Troy Engine & Machine Co. 16
Tube-Turns, Inc. ..... *

Union Carbide & Carbon Corp. 35
Unit Heater & Cooler Co. ..... *
United States Gauge Co. 175
U. S. Steel Corp. Subsidiaries. .... *

Viking Pump Co. ..... *
Vogt Machine Co., Henry 207

Walworth Co. 221
Warren Steam Pump Co. 218
Watson Stillman Co. 174
Webster & Co., Warren ..... *
Western Chemical Co. 211
Western Precipitation Corp. ..... *
Westinghouse Electric & Mfg. Co. .52–53
Weston Electrical Instrument Corp. 158, 201
Wickwire Spencer Steel Co. 154
Wiley & Sons, John ..... *
Wilson Inc., Thomas C. ..... *
Worthington Pump & Machinery Corp. ..... *

Yarnall-Waring Co. 101, 183 186, 206, 211
Youngstown Sheet & Tube Co. 151

Zernickow Co., O. ..... *

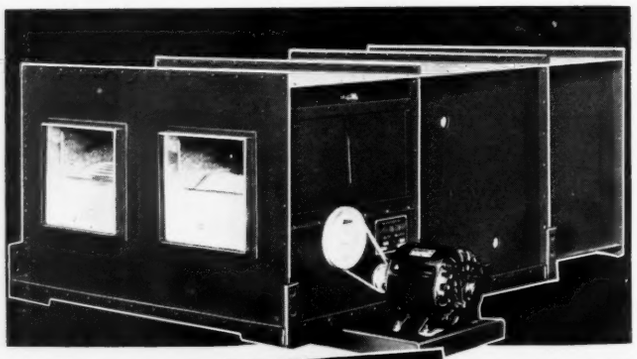
Professional Services 252

Searchlight Section

(Classified Advertising)

Classification

Business Opportunities 253
Employment Services 253
Positions Vacant 253
Positions Wanted 253
Selling Opportunities 253
Wanted to Purchase 253
Used Equipment 236, 251, 253



CLARAGE

Designed to control temperature and humidity within close limits. Can be made completely automatic in operation, regulated by room thermostat and humidistat.

Multitherm Units

✓Cooling
✓Heating
✓Complete Conditioning

Finest type of equipment available for small summer cooling, winter heating or complete year-round air-conditioning jobs. Widely used in factories, offices, stores, etc. Highly efficient; remarkably compact; easily installed in any idle space.

Write for Bulletin 107 describing various arrangements and giving capacity ratings.

CLARAGE FAN COMPANY
811 PORTER STREET • KALAMAZOO, MICH.
Sales Engineering Offices in all Principal Cities

CUTS CORNERS-COSTS
...IN MAINTENANCE TESTING

With Clamp-Ammeter testing so simple . . . requiring so little time . . . plants everywhere are adopting this modern test procedure. *There are no hook-ups necessary . . . no transformers or shunts required . . . no circuits to be disturbed.* Simply place the clamping jaws around the conductor or switch blade, and the meter indicates the current in the circuit. Tests on AC electrical circuits are made in a fraction of the time usually required. » » » Be sure you have all the facts on this modern, inexpensive maintenance tool. Write to Weston Electrical Instrument Corporation, 679 Frelinghuysen Avenue, Newark, New Jersey.

THE WESTON MULTI-RANGE AC CLAMP AMMETER

AC GENERATORS
(See Generators, Electric)

AC MOTORS
(See Motors, Electric)

ACCUMULATORS, STEAM
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Republic Flow Meters Co, 2222 Diversey Pkway, Chicago, Ill.
Koppers Co, Pittsburgh, Pa.

ADSORBERS, ODOR
Dorex Air Conditioning Div, 116A E 32nd St, New York, N. Y.

AFTERCOOLERS
(See Heat Exchangers)

AIR COMPRESSORS
(See Compressors)

AIR-CONDITIONING SYSTEMS
(See Also Refrigerating Systems)
American Blower Corp, 6000 Russell St, Detroit, Mich.
Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Clarage Fan Co, 621 Porter St, Kalamazoo, Mich.
Frick Co, 325 Broadway, Waynesboro, Pa.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Research Corp, 405 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Carrier Corp, Syracuse, N. Y.
Davis Engrg Corp, 1064–16 E Grand St, Elizabeth, N. J.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, Ohio
McQuay Inc, Minneapolis, Minn.
Ross Heater & Mfg Co, 1409 West Ave, Buffalo, N. Y.
Schubert-Christy Corp, 1600 Georgia St, Affton Station, St Louis, Mo.
Skinner Heating & Ventilating Co, 1990 N 9th, St Louis, Mo.
Surface Combustion Corp, Sieloff St, Toledo, Ohio
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

AIR HEATERS
(See Preheaters, Air)

ALARM SYSTEMS, FIRE
(See Sprinkler Systems, Fire)

ALARMS, LOW-WATER
(See Water Columns)

ALLOYS, METALS FOR SPECIAL SERVICE
American Brass Co, Waterbury, Conn.
Byers, A M, Co, Pittsburgh, Pa.
Haynes Stellite Co, 30 E 42nd St, New York, N. Y.
International Nickel Co, 67 Wall St, New York, N. Y.
Scovill Mfg Co, 99 Mill St, Waterbury, Conn.
Timken Roller Bearing Co, Canton, Ohio
Duriron Co, Inc, Dayton, Ohio
Phelps Dodge Copper Products Corp, 40 Wall St, New York, N. Y.
Meehanite Institute, Pittsburgh, Pa.

ALUMINUM PAINT
(See Paint, Aluminum)

AMMETERS
Columbia Electric Mfg Co, 4519 Hamilton Ave, Cleveland, Ohio
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave Newark, N. J.
Bristol Co, Waterbury, Conn.
Esterline-Angus Co, Box 596 Indianapolis, Ind.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.

AMMONIA VALVES
(See Valves, Ammonia)

ANEMOMETERS
Zernickow, O, Co, 15 Park Row, New York, N. Y.
Friez, Julien P, & Sons, 4 N Central Ave, Baltimore, Md.

ARC-WELDING EQUIPMENT
(See Welding Equipment)

ARCHES, BOILER
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Carborundum Co, Dept P, Perth Amboy, N. J.
Combustion Engrg Co, 206 Madison Ave, New York, N. Y.
DeWolf Furnace Corp, 77 South Ave, Rochester, N. Y.
American Arch Co, 60 E 42nd St, New York, N. Y.
Bernitz Furnace Appliance Co, 89 Broad St, Boston, Mass.
Bigelow Co, 200–220 River St, New Haven, Conn.
Bigelow-Liptak Corp, 2840 W Grand Blvd, Detroit, Mich.
Chicago Fire Brick Co, 1463 Elston Ave, Chicago, Ill.
Green, A P, Firebrick Co, 1020 Breckenridge, Mexico, Mo.
Harbison-Walker Refractories Co, Pittsburgh, Pa.
McLeod & Henry Co, Inc, 31 Monroe St, Troy, N. Y.
Plibrico Jointless Firebrick Co, 1818 Kingsbury, Chicago, Ill.
Ramtite Co, 2563 W 18th St, Chicago, Ill.
Reintjes, Geo P, Co, 2517 Jefferson, Kansas City, Mo.
Wickes Boiler Co, 512 N Water St, Saginaw, Mich.

ASBESTOS PRODUCTS
(See Also Boards, Insulation, Pipe and Packing)
Carey, Philip, Co, Lockland, O.
Eagle Picher Sales Co, P D 39, Temple Bar Bldg, Cincinnati, Ohio
Johns-Manville, 22 E 40th St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
Ehret Magnesia Mfg Co, Valley Forge, Pa.
Standard Asbestos Mfg Co, 820 West Lake St, Chicago, Ill.
Union Asbestos & Rubber Co, 1821 S 54th Ave, Cicero, Ill.

ASH-HANDLING EQUIPMENT
(See Conveyors, Sluices, Storage)

BAFFLES, BOILER
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Engineer Co, 17 Battery Place, New York, N. Y.
Smith, Sanford C, Refractories Inc, 1715 Niagara St, Buffalo, N. Y.
Chicago Fire Brick Co, 1463 Elston Ave, Chicago, Ill.
Harbison-Walker Refractories Co, Pittsburgh, Pa.
Plibrico Jointless Firebrick Co, 1818 Kingsbury, Chicago, Ill.
Power Plant Efficiency Co, 155 E Market St, No. 702, Indianapolis, Ind.
Ramtite Co, 2563 W 18th St, Chicago, Ill.
Reintjes, Geo P, Co, 2517 Jefferson, Kansas City, Mo.

BALANCED VALVES
(See Valves, Balanced)

BAROMETERS
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Taylor Instrument Cos, Rochester, N. Y.
Bristol Co, Waterbury, Conn.

Friez, Julien P, & Sons, 4 N Central Ave, Baltimore, Md.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.
Uehling Instrument Co, 470 Getty Ave, Paterson, N. J.

BASES, MOTOR

Alexander Bros, 410 N 3rd St, Philadelphia, Pa.
American Pulley Co, 4200 Wissahicon Ave, Philadelphia, Pa.
Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.
Littleford Bros, 427 E Pearl St, Cincinnati, Ohio
Rockwood Mfg Co, 1801 English Ave, Indianapolis, Ind.

BATTERIES, STORAGE

Electric Storage Battery Co, Allegheny Ave & 18th St, Philadelphia, Pa.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Edison, Thomas A, Inc, West Orange, N. J.
Philadelphia Storage Battery Co, Ontario & C Sts, Phila, Pa.
U.S.L. Battery Corp, Niagara Falls, N. Y.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.
Willard Storage Battery Co, 246 E 131 St, Cleveland, Ohio

BEARINGS, ANTI-FRICTION

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Standard Pressed Steel Co, Jenkintown, Pa.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Timken Roller Bearing Co, Canton, Ohio
Bantam Bearings Corp, South Bend, Ind.
Dodge Mfg Co, Mishawaka, Ind.
Fafnir Bearing Co, 77 Booth St, New Britain, Conn.
Gwilliam Co, 370 Furman St, Brooklyn, N. Y.
H & O Machinery & Engrg Co, 281 Passaic St, Newark, N. J.
Hyatt Bearings Div, General Motors Corp, Anderson, Ind.
McGill Mfg Co, 270 Indiana Ave, Valparaiso, Ind.
Medart Co, 3548 De Kalb St, St. Louis, Mo.
New Departure Div, General Motors Corp, Bristol, Conn.
Nice Ball Bearing Co, Philadelphia, Pa.
Norma-Hoffman Bearings Corp, Stamford, Conn.
Royersford Foundry & Machine Co, 75 Main, Royersford, Pa.
Shafer Bearing Corp, 35 E Wacker Drive, Chicago, Ill.
SKF Industries, Inc, Trent St & Erie Ave, Philadelphia, Pa.
Wood's, T B, Sons Co, 1165 5th Ave, Chambersburg, Pa.

BEARINGS, OILLESS

American Crucible Products Co, Lorain, Ohio
Continental Diamond Fibre Co, Newark, Del.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Lignum-Vitae Products Corp, Jersey City, N. J.
Nolu Oilless Bearing Co, 16 E Johnson, Philadelphia, Pa.
Rhoades, R W, Metaline Co, 50–19 5th St, Long Island City, N. Y.

Look for the noun in the product listing, for example:

"Arches, Boiler"

not

"Boiler Arches"

BEARINGS, SLEEVE

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Bearium Metals Corp, 258 State St, Rochester, N. Y.
Bunting Brass & Bronze Co, Toledo, Ohio
Chrysler Corp, Amplex Div, P O Box 2718, Detroit, Mich.
Dodge Mfg Co, Mishawaka, Ind.
Johnson Bronze Co, New Castle, Pa.
Kingsbury Machine Works, Inc, 4324 Tackawanna St, Phila, Pa.
Magnolia Metal Co, 120 Bay Way, Elizabeth, N. J.
Saginaw Bearing Co, 825 S Water St, Saginaw, Mich.
Wood's, T B, Sons Co, 1165 5th Ave, Chambersburg, Pa.

BEARINGS, THRUST

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Bantam Bearings Corp, South Bend, Ind.
Bearium Metals Corp, 258 State St, Rochester, N. Y.
Fafnir Bearing Co, 77 Booth St, New Britain, Conn.
Gwilliam Co, 370 Furman St, Brooklyn, N. Y.
Howarth Pivoted Bearing Co, Ontario & 23rd Sts, Phila, Pa.
Kingsbury Machine Works, 4324 Tackawanna St, Phila, Pa.
New Departure Div, General Motors Corp, Bristol, Conn.
Nice Ball Bearing Co, Philadelphia, Pa.
Norma-Hoffman Bearings Corp, Stamford, Conn.
SKF Industries, Inc, Front St & Erie Ave, Philadelphia, Pa.

BELT CONVEYORS

(See Conveyors)

BELT DRESSING

(See Dressing, Belt)

BELT LACING

(See Lacing, Belt)

BELTING, CONVEYOR

Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Manhattan Rubber Mfg Div, 94 Townsend St, Passaic, N. J.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Boston Woven Hose & Rubber Co, Cambridge, Mass.
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, (Norwood) Cincinnati, Ohio
Dick, R & J, Co, Inc, Colfax Ave, Passaic, N. J.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Manheim Mfg & Belting Co, 120 Steigel St, Manheim, Pa.
Quaker City Rubber Co, Comly & Milnor Sts, Philadelphia, Pa.
Republic Rubber Co, Youngstown, Ohio
Scandinavia Belting Co, 250 Central Ave, Newark, N. J.
Stanley Belting Corp, 15 N Jefferson St, Chicago, Ill.
Thermoid Co, Trenton, N. J.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.

BELTING, LEATHER

Rhoads, J E, & Sons, 35 N 6th St, Philadelphia, Pa.
Alexander Bros, 410 N 3rd St, Philadelphia, Pa.
Baldwin Belting & Leather Co, 85 Chambers St, New York, N. Y.
Bond, Charles, Co, Philadelphia, Pa.
Chicago Belting Co, Chicago, Ill.
Chicago Rawhide Mfg Co, Chicago, Ill.
Eagle Belting & Leather Co, 1405 Central Pkwy, Cincinnati, O.
Graton & Knight Co, Worcester, Mass.
Houghton, E F & Co, 244–50 W Somerset, Philadelphia, Pa.
Laurence Belting Co, 115 Chambers St, New York, N. Y.
Page Belting Co, Concord, N. H.
Pennwell Oil & Belting Co, Inc, 5 White St, New York, N. Y.
Philadelphia Belting Co, 6th & Spring Garden Sts, Philadelphia, Pa.
Schieren, Chas A, Co, 30–39 Ferry St, New York, N. Y.
Schwartz Belting Co, 74 Murray St, New York, N. Y.
Slip-Not Belting Corp, Kingsport, Tenn.
Stanley Belting Corp, 15 N Jefferson St, Chicago, Ill.
Williams, I B, & Sons, 73 Murray St, New York, N. Y.

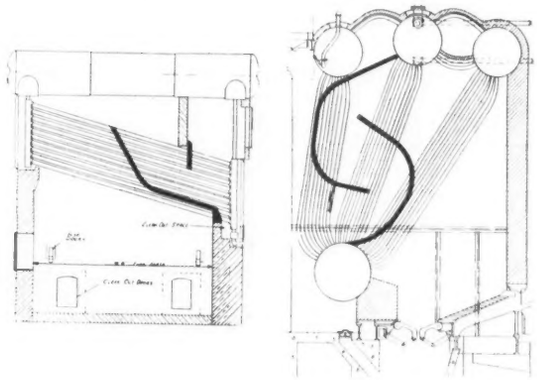
BELTING, RUBBER

Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Gilmer, L H, Co, 7360 Keystone St, Tacony, Phila, Pa.
Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Manhattan Rubber Mfg Div, 94 Townsend St, Passaic, N. J.
Boston Woven Hose & Rubber Co, Cambridge, Mass.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, Cincinnati, O.
Gates Rubber Co, Denver, Colo.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Hewitt Rubber Co, Buffalo, N. Y.
Manheim Mfg & Belting Co, 120 Steigel St, Manheim, Pa.
Quaker City Rubber Co, Comly & Milnor Sts, Philadelphia, Pa.
Republic Rubber Co, Youngstown, Ohio
Thermoid Co, Trenton, N. J.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.

Enco Baffle Walls

STREAMLINING BOILER BAFFLES

—insure better heat distribution—eliminate eddy currents—permit soot blowers to work more effectively and keep the boiler clean for a longer period because there are no angle joints to form pockets that will collect soot and fly ash.

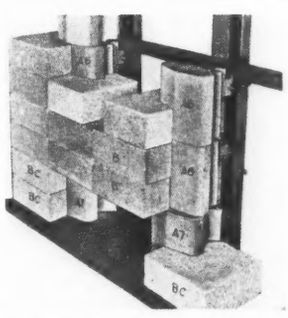


Bulletin BW-37 describes in detail The Construction of Enco Baffle Walls and Their Application to All Types and Sizes of Boilers and the Modernization of Existing Plants.

Write for a copy.

THE ENGINEER COMPANY
17 BATTERY PLACE NEW YORK, N. Y.

DeWolf STEEL STRUCTURE SECTIONALLY SUPPORTED



WALLS & ARCHES

No metal embedded in the refractory. Expansion strains relieved without expansion joints. Air Cooled or Insulated construction for boiler furnaces, incinerators, heating furnaces, etc. Write for Bulletin.

DeWOLF FURNACE CORPORATION
77 South Ave. . . . Rochester, New York

CLARAGE
VORTEX CONTROL

Regulates Fan Capacity without Expensive Variable Speed Devices . . .

Proven method of fan volume control that SAVES MONEY! Doesn't waste power as a damper does. Very inexpensive as compared to variable speed motor.

Vortex Control (patented) gives ANY capacity regulation desired with fan operating at constant speed. Thousands of installations giving perfect satisfaction. Write for Bulletin 101.

CLARAGE FAN COMPANY
811 PORTER STREET • KALAMAZOO, MICH.
Sales Engineering Offices in all Principal Cities

Guard against "Caustic Embrittlement"

Cook out your boilers with

NALCO No. 81

1. When starting up new boilers
2. After repairing old boilers

(Follow with Nalco specified chemicals regularly)

NALCO No. 81 is a scientific oil emulsifying agent which is five times more effective than caustic soda and it leaves no deposit of caustic in seams or around rivet heads. Write for complete information. NATIONAL ALUMINATE CORPORATION, 6222 W. 66th Place, Chicago, Ill.

THE Nalco SYSTEM
OF WATER TREATMENT

BELTS, "V"

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Gilmer, L H, Co, 7360 Keystone St, Tacony, Philadelphia, Pa.
Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Manhattan Rubber Mfg Div, 94 Townsend St, Passaic, N. J.
Bond, Charles, Co, Philadelphia, Pa.
Dayton Rubber Mfg Co, Dayton, Ohio
Dick, R & J, Co, Inc, Colfax Ave, Passaic, N. J.
Gates Rubber Co, Denver, Colo.
Goodrich, B F, Co, 460 S Main St. Akron, Ohio
Manheim Mfg & Belting Co, 120 Steigel St, Manheim, Pa.
Medart Co, 3548 De Kalb St, St. Louis Mo.
Rockwood Mfg Co, 1801 English Ave, Indianapolis, Ind.
Schieren, Chas A, Co, 30-39 Ferry St, New York, N. Y.
Stanley Belting Corp, 15 N Jefferson St, Chicago, Ill.
Thermoid Co, Trenton, N. J.
Wood's, T B, Sons Co, 1165 5th Ave, Chambersburg, Pa.

BIN GATES

Allen-Sherman-Hoff Co, 227 S 15th St, Philadelphia, Pa.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Rockwell, W S Co, 50 Church St, New York, N. Y.
Brady Conveyors Corp, 20 Jackson Blvd, Chicago, Ill.
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.

BLOWDOWN SYSTEMS, BOILER, CONTINUOUS

Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Elgin Softener Corp, 55 North St, Elgin, Ill.
Henszey Co, Dept D14, Watertown, Wis.
Permutit Co, Dept A, 330 W 42 St, New York, N. Y.
Scaife, Wm B, & Sons Co, River & Ann St, Oakmont, Pa.
Strong, Carlisle & Hammond Co, 1392 W 3rd, Cleveland, Ohio
Madden, P E, Co, Chicago, Ill.

BLOWERS

(See Also Fans, Turbo-Blowers)
Allis-Chalmers Mfg Co, Milwaukee, Wis.
American Blower Corp, 6000 Russell St, Detroit, Mich.
Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Clarage Fan Co, 621 Porter St, Kalamazoo, Mich.
Coppus Engrg Corp, 350 Park Ave, Worcester, Mass.
De Laval Steam Turbine Co, Trenton, N. J.
Elliott Co, Jeannette, Pa.
Erie Electric Co, 124 Church St, Buffalo, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Moore Steam Turbine Corp, 37 Coats St, Wellsville, N. Y.
Allen Billmyre Corp, Daily News Bldg, New York, N. Y.
Allen, E H, & Co, Dept P, 22 Dorance St, Boston, Mass.
Bayley Blower Co, 1817 S 66th St, Milwaukee, Wis.
Breuer Electric Mfg Co, 5100 N Ravenswood Ave, Chicago, Ill.
Carling Turbine Blower Co, 25 St John's Rd, Worcester, Mass.
Eclipse Fuel Engineering Co, 707 S Main St, Rockford, Ill.
Garden City Fan Co, 332 S Michigan Ave, Chicago, Ill.
Green Fuel Economizer Co, Inc, 637 Main St, Beacon, N. J.
Janette Mfg Co, 556 W Monroe St, Chicago, Ill.
Johnson Fan & Blower Co, Dept P, 1319 W Lake, Chicago, Ill.
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, O.
Power Turbo-Blower Co, 30 Vesey St, New York, N. Y.
Roots-Connersville Blower Corp, Connersville, Ind.
Skinner Heating & Ventilating Co, 1990 N 9th, St Louis, Mo.
Spencer Turbine Co, 488 New Park Ave, Hartford, Conn.
Standard Electrical Tool Co, 1918 W 8th St, Cincinnati, Ohio
Sterling Blower Co, Hartford, Conn.
Surface Combustion Corp, Toledo, Ohio
Wing, L J, Mfg Co, W 14th St & 7th Ave, New York, N. Y.

BLOWERS, SOOT

Diamond Power Specialty Corp, Box 288, Detroit, Mich.
Bayer Co, 4026 Chouteau Ave, St Louis Mo.
General Specialty Co, Inc, 67 Carroll St, Buffalo, N. Y.
Hahn Engineering Co, 30 Church St, New York, N. Y.
Vulcan Soot Blower Co, Du Bois, Pa.

BOARDS, ASBESTOS

Carey, Philip, Co, Lockland, O.
Johns-Manville, 22 E 40th St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
Ehret Magnesia Mfg Co, Inc, Valley Forge, Pa.
Standard Asbestos Mfg Co, 820 W Lake St, Chicago, Ill.

BOARDS, GAGE

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Taylor Instrument Cos, Rochester, N. Y.
Bristol Co, Waterbury, Conn.
Lonergan, J E, Co, Phila, Pa.

BOILER COMPOUNDS

(See Water Treatment, Softeners)

BOILER-TUBE CLEANERS

(See Cleaners, Boiler-Tube)

BOILER TUBES

(See Tubes, Boiler)

BOILERS, ELECTRIC

General Electric Co, Schenectady, N. Y.
Westinghouse Electric & Mfg Co, East Pittsburgh, Pa.
Bigelow Co, 200-220 River St, New Haven, Conn.
Hynes Electric Heating Co, 240 Cherry St, Philadelphia, Pa.

BOILERS, FIRE-TUBE

Brownell Co, 301 N Findlay St, Dayton, Ohio
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Keeler, E, Co, Williamsport, Pa.
Murray Iron Works Co, Burlington, Iowa
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Bigelow Co, 200-220 River St, New Haven, Conn.
Birmingham Boiler & Engrg Co, Birmingham, Ala.
Bros, Wm, Boiler & Mfg Co, Nicollet Id, Minneapolis, Minn.
Cleaver-Brooks Co, 3120 W Center St, Milwaukee, Wis.
Eclipse Fuel Engrg Co, 707 S Main St, Rockford, Ill.
Erie City Iron Works, 1422 East Ave, Erie, Pa.
Farrar & Trefts, Inc, Buffalo, N. Y.
Fitzgibbons Boiler Co, Inc, 101 Park Ave, New York, N. Y.
Gem City Boiler Co, Dept R, Dayton, Ohio
Heilman Boiler Works, Allentown, Pa.
Hodge Boiler Works, East Boston, Mass.
Kewanee Boiler Corp, Kewanee, Ill.
Kroeschell Boiler Co, Racine, Wis.
Lookout Boiler & Mfg Co, Chattanooga, Tenn.
Mears-Kane-Ofeldt, Inc, Philadelphia, Pa.

Get Your FREE Copy of the New Gilmer GUIDE

with the NEW H.P. RATING TABLES

96 pages!

TO EFFICIENT V-BELT PRACTISE

With new H.P. rating tables, a new method in the Industry of rating the H.P. of V-Belts

● This 96-page book is not merely a catalogue — it is an engineering handbook, crammed full of information that you need constantly. It is easy to use. It is the most complete V-Belt reference manual available. An authoritative guide on transmission problems for which you have constant need.

SPECIAL FEATURES OF THE NEW GILMER GUIDE

The Engineering Section includes data on standard multiple V-Belt drives, f.h.p. drives, and special V-Belt drives, including an easy, practical method for determining proper belt tension for longer belt life and better service

- New H.P. Rating Tables
  (A new method in the Industry of rating the H.P. of V-Belts)
- Application Correction Factor Table
  (complete, speedy and foolproof)
- W.R² Flywheel Effect Graph
  (Enables anyone to determine in 2 minutes what heretofore has meant long tedious figuring or the use of higher mathematics)
- Formulas for both Multiple and F.H.P. Drives
- Arc of Contact Correction Factor Table
  (including V-Flat Drives)
- Selection Tables on both Multiple and F.H.P. Drives
  (Ingenious tint block color system simplifies finding arc of contact)
- TWO complete indexes
  (to enable you to quickly find the information sought)

L. H. GILMER COMPANY, Tacony, Philadelphia, Pa.

"The Oldest Firm of Rubber Fabric Belt Specialists"

A COPY OF THE NEW GILMER GUIDE WILL BE SENT FREE UPON REQUEST

L. H. GILMER COMPANY, Tacony, Philadelphia, Pa.

I'd appreciate receiving a copy of your new 96-page Gilmer Guide to Efficient V-Belt Practise.

NAME _____

ADDRESS _____

Ohio Machine & Boiler Co, Cleveland, Ohio
Pacific Steel Boiler Corp, 1056 National Bank Bldg, Detroit, Mich.
Titusville Iron Works Co, Titusville, Pa.
Tudor Boiler Mfg Co, Cincinnati, Ohio
Union Iron Works, Erie, Pa.
Webster, Howard J, Greene & Hortter Sts, Philadelphia, Pa.
Wickes Boiler Co, 512 N Water St, Saginaw, Mich.

BOILERS, WATER-TUBE

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Controlled Steam Generators, 330 W 42nd St, New York, N. Y.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Keeler, E, Co, Williamsport, Pa.
Murray Iron Works Co, Burlington, Iowa
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Springfield Boiler Co, 1903 E Capitol Ave, Springfield, Ill.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Almy Water Tube Boiler Co, 184 Allens Ave, Providence, R. I.
American Steam Automobile Co, West Newton, Mass. (Miniature)
Besler Systems, 4053 Harlan St, Oakland, Calif. (High-pressure series boiler)
Bigelow Co, 200-220 River St, New Haven, Conn.
Bros, Wm, Boiler & Mfg Co, Nicollet Id, Minneapolis, Minn.
Erie City Iron Works, 1422 East Ave, Erie, Pa.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Kroeschell Boiler Co, Racine, Wis.
Page Boiler Co, 820 W Webster Ave, Chicago, Ill.
Titusville Iron Works Co, Titusville, Pa.
Tudor Boiler Mfg Co, Cincinnati, Ohio
Union Iron Works, Erie, Pa.
Wickes Boiler Co, 512 N Water St, Saginaw, Mich.

BOILERS, WASTE-HEAT

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Murray Iron Works Co, Burlington, Iowa
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Springfield Boiler Co, 1903 E Capitol Ave, Springfield, Ill.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.

BOILERS, ENGINE-EXHAUST, WASTE-HEAT

Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Murray Iron Works Co, Burlington, Iowa
Alco Products Div, 30 Church St, New York, N. Y.
Davis Engrg Corp, 1064-16 East Grand St, Elizabeth, N. J.
Sims Co, Erie, Pa.

BREAKERS, CIRCUIT, AIR

Allis-Chalmers Mfg Co, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
I-T-E Circuit Breaker, 19th & Hamilton St, Phila, Pa.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.
Square D Co, Rivard & Piquette Sts, Detroit, Mich.

BREAKERS, CIRCUIT, OIL

Allis-Chalmers Mfg Co, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Pacific Electric Mfg Co, San Francisco, Calif.

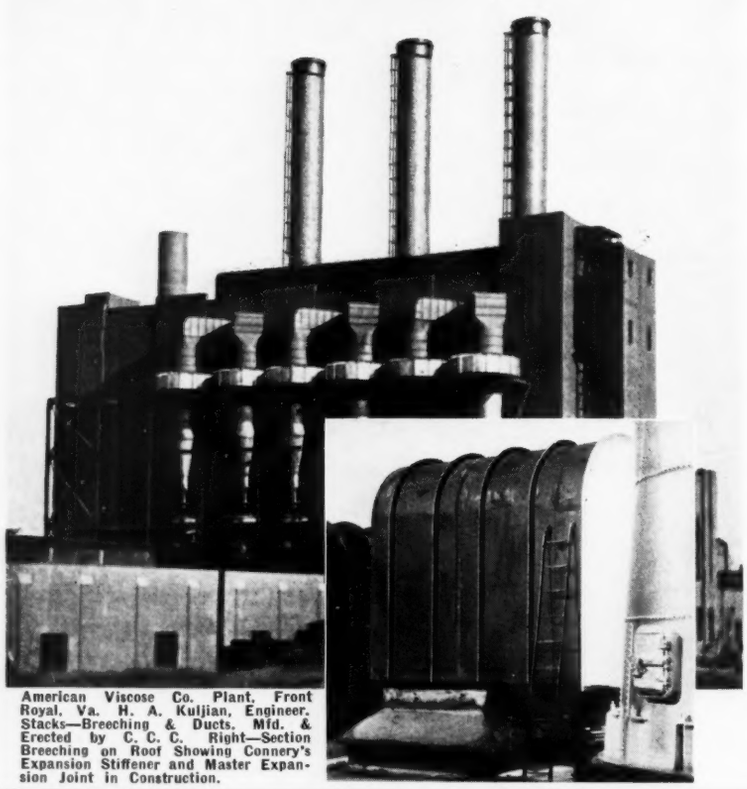
BREECHINGS

Brownell Co, 301 N Findlay St, Dayton, Ohio
Chicago Bridge & Iron Co, 2454 Old Colony Bldg, Chicago, Ill.
Connery Construction Co, 2nd & Luzerne Sts, Phila, Pa.
Graver Tank & Mfg Co, Inc, East Chicago, Ind.
Keeler, E, Co, Williamsport, Pa.
Bergen Point Iron Works, Bayonne, N. J.
Bros, Wm, Boiler & Mfg Co, Nicollet Id, Minneapolis, Minn.
Burhorn, Edwin, Co, 1 Newark St, Hoboken, N. J.
Caldwell, W E, Co, Inc, 280 Brandeis St, Louisville, Ky.
Chattanooga Boiler & Tank Co, Box 110, Chattanooga, Tenn.
Colonial Iron Works Co, 17643 St Clair Ave, Cleveland, Ohio
Dover Boiler Works, 90 E Dickerson St, Dover, N. J.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Green Fuel Economizer Co, Inc, 637 Main St, Beacon, N. Y.
Hodge Boiler Works, East Boston, Mass.
International Engrg Works, Inc, Framingham, Mass.
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, Ohio
Munro, R, & Sons Mfg Corp, 23rd St, Pittsburgh, Pa.
Ohio Machine & Boiler Co, Cleveland, Ohio
Portland Co, Portland, Maine
Stover Steel Tank & Mfg Co, Freeport, Ill.
Titusville Iron Works Co, Titusville, Pa.
Treadwell, M H, Co, 140 Cedar St, New York, N. Y.
Wickes Boiler Co, 512 N Water St, Saginaw, Mich.
Young & Bertke Co, 1040 W Hulbert Ave, Cincinnati, O.
Youngstown Steel Tank Co, Youngstown, Ohio

BRICK, FIRE

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Carborundum Co, Dept P, Perth Amboy, N. J.
DeWolf Furnace Corp, 77 South Ave, Rochester, N. Y.
Bernitz Furnace Appliance Co, 89 Broad St, Boston, Mass.
Bigelow-Liptak Corp, 2840 W Grand Blvd, Detroit, Mich.
Brooklyn Fire Brick Works, 88 Van Dyke St, Brooklyn, N. Y.
Chicago Fire Brick Co, 1463 Elston Ave, Chicago, Ill.
Denver Fire Clay Co, 2301 Blake St, Denver, Colo.
General Refractories Co, 1600 Real Estate Trust Bldg, Philadelphia, Pa.
Green, A P, Fire Brick Co, 1020 Breckenridge, Mexico, Mo.
Hammond Fire Brick Co, Fairmont, W. Va.
Harbison-Walker Refractories Co, Pittsburgh, Pa.
Illinois Clay Products Co, Joliet, Ill.
Laclede-Christy Clay Products Co, 411 N 7th, St. Louis, Mo.
Louisville Fire Brick Works, Inc, Louisville, Ky.
Mexico Refractories Co, Mexico, Mo.
McLeod & Henry Co, Inc, 31 Monroe St, Troy, N. Y.
Norton Co, Worcester, Mass.
Quigley Co, Inc, 56 W 45th St, New York, N. Y.
Ramtite Co, 2563 W 18th St, Chicago, Ill.

CONNERY CONSTRUCTION in American Viscose Co's Plants



American Viscose Co. Plant, Front Royal, Va. H. A. Kuljian, Engineer. Stacks—Breeching & Ducts. Mfd. & Erected by C. C. C. Right—Section Breeching on Roof Showing Connery's Expansion Stiffener and Master Expansion Joint in Construction.

STACKS – BREECHINGS GAS AND AIR DUCTS

FORMERLY specified for their plants at Marcus Hook, Pa., Meadville, Lewistown, and Parkersburg — CONNERY CONSTRUCTION again goes into American Viscose Company's new property at Front Royal, Va.

There are six sound reasons for this continued preference for Connery's Expansion Stiffened Breechings, Flues, Uptakes and Ducts: (1) *Simplicity*—no sliding joints (2) *Lightness*—no structural reinforcement (3) *Tightness*—all joints and laps electrically welded (4) *Flexibility*—accordion-type construction (patented) allows expansion, contraction (5) *Strength*—corrugations proved by test stronger than angles, channels or beams (6) *Economy*—costs no more than ordinary construction.

Write us for complete catalog.

CONNERY
CONSTRUCTION CO.
SECOND & LUZERNE STS.
PHILADELPHIA

BRICK, INSULATING

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Baldwin-Hill Co, 575 Klagg Ave, Trenton, N. J.
Johns-Manville, 22 E 40th St, New York, N. Y.
Chicago Fire Brick Co, 1463 Elston Ave, Chicago, Ill.
Ehret Magnesia Mfg Co, Inc, Valley Forge, Pa.
Green, A P, Fire Brick Co, 1020 Breckenridge, Mexico, Mo.
Harbison-Walker Refractories Co, Pittsburgh, Pa.
Laclede-Christy Clay Products Co, 411 N 7th Street, St Louis Mo.
Mexico Refractories Co, Mexico, Mo.
Quigley Co, Inc, 56 W 45th St, New York, N. Y.

BRINE COOLERS

(See Coolers, Brine)

BRUSHES, MOTOR, GENERATOR

Dixon, Jos, Crucible Co, 170 Wayne St, Jersey City, N. J.
National Carbon Co, Cleveland, Ohio
Ohio Carbon Co, Cleveland, Ohio
Speer Carbon Co, 40 Theresia St, Saint Marys, Pa.
U. S. Graphite Co, Saginaw, Mich.

BUNKERS, COAL AND ASH

Allen-Sherman-Hoff Co, 227 S 15th St, Philadelphia, Pa.
Connery Construction Co, 2nd & Luzerne Sts, Phila, Pa.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Caldwell, W E, Co, Inc, 280 Brandeis St, Louisville, Ky.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Chattanooga Boiler & Tank Co, Box 110, Chattanooga, Tenn.
Colonial Iron Works Co, 17643 St Clair Ave, Cleveland, Ohio
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio
Frederick Iron & Steel Co, Frederick, Md.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Hahn Engrg Co, 30 Church St, New York, N. Y.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
United Conveyor Corp, Dearborn & Van Buren Sts, Chicago, Ill.

BURNERS, GAS

Best, W N, Engrg Co, 110 Washington St, New York, N. Y.
Coppus Engrg Corp, 350 Park Ave, Worcester, Mass.
Engineer Co, 17 Battery Place, New York, N. Y.
National Airoil Burner Co, 1327 Girard Ave, Philadelphia, Pa.
Todd Combustion Equipment, 601 W 26th St, New York, N. Y.
Anthony Co, 47-33 5th St, Long Island City, N. Y.
Chicago Flexible Shaft Co, Chicago, Ill.
Coen Co, 42 Boardman Place, San Francisco, Cal.
Combustion Equipment Co, 1820 Cherry St, Kansas City, Mo.
Denver Fire Clay Co, 2301 Blake St, Denver, Colo.
Eclipse Fuel Engrg Co, 707 S Main St, Rockford, Ill.
Hauck Mfg Co, 126 10th St, Brooklyn, N. Y.
Natural Gas Equipment, Inc, 539 Petroleum Securities Bldg, Los Angeles, Calif.
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.
Surface Combustion Corp, Sieloff St, Toledo, Ohio
Tate-Jones & Co, 23 Broad St, Leetsdale, Pa.

BURNERS, GAS AND OIL, COMBINED

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Best, W N, Engrg Co, 110 Washington St, New York, N. Y.
Coppus Engineering Corp, 350 Park Ave, Worcester, Mass.
Engineer Co, 17 Battery Place, New York, N. Y.
Anthony Co, 47-33 5th St, Long Island City, N. Y.
Coen Co, 42 Boardman Place, San Francisco, Calif.
Combustion Equipment Co, 1820 Cherry St, Kansas City, Mo.
Davison Combustion Co, 2939 Smallman St, Pittsburgh, Pa.
Johnson, S T, Co, Oakland, Calif.
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.
Surface Combustion Corp, Sieloff St, Toledo, Ohio

BURNERS, OIL

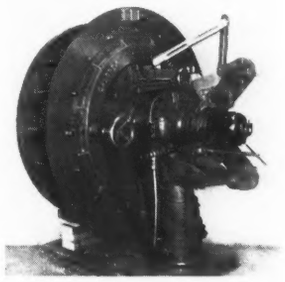
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Best, W N, Engrg Co, 110 Washington St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Engineer Co, 17 Battery Place, New York, N. Y.
National Airoil Burner Co, 1327 Girard Ave, Philadelphia, Pa.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Rockwell, W S, Co, 50 Church St, New York, N. Y.
Todd Combustion Equipment, 601 W 26th St, New York, N. Y.
Aeroil Burner Co, Inc, 577 Park Ave, West New York, N. J.
American Steam Automobile Co, West Newton, Mass.
Anthony Co, 47-33 5th St, Long Island City, N. Y.
Chicago Flexible Shaft Co, Chicago, Ill.
Cleaver-Brooks Co, 3120 W Center St, Milwaukee, Wis.
Coen Co, 42 Boardman Place, San Francisco, Calif.
Combustion Equipment Co, 1820 Cherry St, Kansas City, Mo.
Denver Fire Clay Co, 2301 Blake St, Denver, Colo.
Enterprise Oil Burner Co, 2902 19th St, San Francisco, Cal.
Gilbert & Barker Mfg Co, Springfield, Mass.
Hadley, F V, Co, 127 Federal St, Boston, Mass.
Hagan, George J, Co, Pittsburgh, Pa.
Hauck Mfg Co, 126 10th St, Brooklyn, N. Y.
Hammel Oil Burner Co, Los Angeles, Calif.
Johnson, S T, Co, Oakland, Cal.
Macleod Co, 2236 Bogen St, Cincinnati, Ohio
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.
Petroleum Heat & Power Co, Stamford, Conn.
Ray Oil Burner Co, 411 Bernal Ave, San Francisco, Calif.
Schutte & Koerting Co, 12th & Thompson Sts, Philadelphia, Pa.
Simplex Oil Heating Corp, Room 3004, 21 West St, New York, N. Y.
Steam & Combustion Co, Chicago, Ill.
Tate-Jones & Co, Inc, 23 Broad St, Leetsdale, Pa.
York Oil Burner Co, York, Pa.

BURNERS, PULVERIZED-COAL

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.
Whiting Corp, 15657 Lathrop Ave, Harvey, Ill.

CALOREX INDUSTRIAL BURNERS
for Liquid and Gaseous Fuels

Calorex "Series 10" External Atomizing Burner Fires 5 to 350 gal/hr.



Above—a Bestrol 2,500 lb. capacity oil burner with air register and full automatic combustion control, which interlocks all combustion components to a single control connection.

The "Calorex" line includes oil burners, tar and colloidal fuel burners, gas burners, and combination oil and gas burners for every industrial purpose; atomizing burners—steam, medium and high pressure air, stationary tip low pressure air; mechanical burners—high pressure and low pressure, electric driven rotary cup type; fuel oil pumping and heating units—steam or electrically actuated, and atomizing air supply types.

A complete line of accessories include automatic combustion controls, fuel oil and steam interlocking valves and fuel oil strainers.

An engineering department is available for advisory service and supervision.

Write for descriptive matter on fuel burning equipment applying to your specific requirements.

W. N. BEST ENGINEERING CO. INC.

Manufacturers of Industrial Oil and Gas Burning Equipment

110 Washington St. New York, N. Y.

Enco Burners

for all grades of Oil, Tar or Gas

Burner Units of Steam or Mechanical Atomizing Types in various sizes with capacity ranges of from 1 to 1000 gals. per hour.

Designed for operation either with or without air register for natural or forced draft.

The ENCO Interchangeable Oil Burner is designed for instant change of atomizer gun for operation by either steam or mechanical (pressure) system or to cover a wide range of capacity.

ENCO Oil Atomizers are being applied to various types of standard pulverized coal burner units to provide a dual fuel unit for cold starting or for full load operation when coal is not available or when oil is the more economical fuel.

We have made many installations and would be glad to cooperate with those looking for better operation and assurance against loss of steam output.

Write for Bulletin IB-37 describing ENCO Oil-Gas Burning Equipment.

THE ENGINEER COMPANY

17 BATTERY PLACE NEW YORK, N. Y.

BURNERS, PULVERIZED-COAL, OIL AND GAS COMBINED

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engineering Co, Inc, 206 Madison Ave, New York, N. Y.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.

CABLE

(See Wire & Cable, Electric)

CALORIMETERS, STEAM

Ellison Draft Gage Co, 214 W Kinzie St, Chicago, Ill.

CAR UNLOADERS

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Beaumont-Birch Co, Phila, Pa.
Wellman Engrg Co, 7000 Central Ave, Cleveland, Ohio
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio
Jeffrey Mfg Co, 932–99 N 4th St, Columbus, Ohio

CARBON BRUSHES

(See Brushes, Motor, Generator)

CARS, COAL AND ASH

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Bergen Point Iron Works, Bayonne, N. J.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Pressed Steel Car Co, Inc, Pittsburgh, Pa.

BOTFIELD REFRACTORIES

—for low cost furnace maintenance

Adamant Fire Brick Cement

—a plastic ready mixed cement that air sets and maintains bond throughout entire temperature range. Exceptionally strong joints that do not crack or shrink in setting. The smoothest cement on the market.

Adachrome Plastic Super Cement

A longer lasting plastic chrome cement for use where high temperatures, slag action, abrasion, erosion or other destructive elements are encountered. Shipped ready for use.

Ada-Stic Plastic Insulating Cement

An ideal insulating material for countless uses. More insulating value for less money. Easy to apply. Attractive finish.

BOTFIELD REFRACTORIES COMPANY

World's Largest Makers of High Temperature Cements

Swanson & Clymer Sts. Philadelphia, Pa.

NATIONAL AIROIL BURNER COMPANY

ESTABLISHED 1912 INCORPORATED 1917

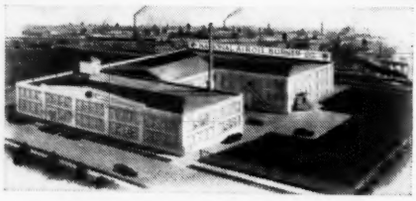
Manufacturers
Installation
Engineers
Sales - Service

Industrial
Oil Burners
Gas Burners and
Furnace Equipment

Automatic Oil Burners
for Homes
Apartment Houses
Churches
Stores
Factory Buildings
Office Buildings

NATIONAL AIROIL BURNER

Specializing in Equipment
for Chemical Manufacturers
Glass, Ceramic and Refractory Manufacturers
Metallurgical Industries
Petroleum Refining and Related Industries
Sugar Manufacturers and Refiners
Domestic and Intercoastal Steam Vessels
Public Service Power Plants
Factory Power and Heating Plants
Lighting and Auxiliary Oil Burning Equipment for Powdered Coal Plants



Modern daylight factory owned and occupied exclusively by ourselves

NATIONAL AIROIL BURNER COMPANY

1250 E. Sedgley Ave.

Philadelphia, Pa.

CASUALTY INSURANCE

Ocean Accident & Guarantee Corp, 1 Park Ave, New York, N. Y.
Continental Casualty Co, 910 S Michigan Ave, Chicago, Ill.
Globe Indemnity Co, 150 William St, New York, N. Y.
Hartford Steam Boiler Inspection & Ins Co, Hartford, Conn.
Insurance Co of North America, 1600 Arch St, Phila, Pa.
Maryland Casualty Co, Baltimore, Md.
Mutual Boiler Insurance Co of Boston, 60 Batterymarch, Boston, Mass.
Royal Indemnity Co, 150 William St, New York, N. Y.
Travelers Insurance Co, Hartford, Conn.
U S Fidelity & Guarantee Co, Baltimore, Md.

CEMENT, ACID-RESISTANT

Johns-Manville, 22 E 40th St, New York, N. Y.
Electro-Chemical Supply & Engrg Co, Paoli, Pa.
Haveg Corp, Newark, Del.
Quigley Co, Inc, 56 W 45th St, New York, N. Y.
U. S. Stoneware Co, 62 E 42nd St, New York, N. Y.

CEMENT, BELT

Rhoads, J E, & Sons, 35 N 6th St, Philadelphia, Pa.
Baldwin Belting & Leather Co, 85 Chambers, New York, N. Y.
Laurence Belting Co, 115 Chambers St, New York, N. Y.
Philadelphia Belting Co, 6th & Spring Garden Sts, Phila, Pa.
Raniville, F, Co, Grand Rapids, Mich.
Schieren, Chas A, Co, 30–39 Ferry St, New York, N. Y.

CEMENT, INSULATING, HEAT

Baldwin-Hill Co, 575 Klagg Ave, Trenton, N. J.
Carey, Philip, Co, Lockland, O.
Eagle Picher Sales Co, P D 89, Temple Bar Bldg, Cincinnati, Ohio.
Johns-Manville, 22 E 40th St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
National Engrg Products, Inc, Commerce & Savings Bldg, Washington, D. C.
Denver Fire Clay Co, 2301 Blake St, Denver, Colo.
Ehret Magnesia Mfg Co, Inc, Valley Forge, Pa.
Quigley Co, Inc, 56 W 45th St, New York, N. Y.
Refractory & Insulation Corp, 381 4th Ave, New York, N. Y.
Standard Asbestos Mfg Co, 820 W Lake St, Chicago, Ill.

CEMENT, REFRACTORY

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Botfield Refractories Co, 776-82 S Swanson St, Phila, Pa.
Carborundum Co, Dept P, Perth Amboy, N. J.
Johns-Manville, 22 E 40th St, New York, N. Y.
National Engrg Products Co, Commerce & Savings Bldg, Washington, D. C.
Smith, Sanford C, Refractories Co, 1715 Niagara St, Buffalo, N. Y.
Bernitz Furnace Appliance Co, 89 Broad St, Boston, Mass.
Carolina Refractories Co, Hartsville, S. C.
Chicago Fire Brick Co, 1463 Elston Ave, Chicago, Ill.
Denver Fire Clay Co, 2301 Blake St, Denver, Colo.
Drake Non-Clinkering Furnace Block Co, Beekman St, New York, N. Y.
Faulkner, J A, Refractories Co, Youngstown, Ohio.
General Refractories Co, 1600 Real Estate Trust Bldg, Philadelphia, Pa.
Green, A P, Fire Brick Co, 1020 Breckenridge, Mexico, Mo.
Harbison-Walker Refractories Co, Pittsburgh, Pa.
Keystone Refractories Co, 120 Liberty St, New York, N. Y.
Laclede-Christy Clay Products Co, 411 N 7th, St. Louis, Mo.
McLeod & Henry Co, Inc, 31 Monroe St, Troy, N. Y.
Mexico Refractories Co, Mexico, Mo.
Norton Co, Worcester, Mass.
Pyro Clay Products Co, Oak Hill, Ohio.
Quigley Co, Inc, 56 W 45th St, New York, N. Y.
Ramtite Co, 2563 W 18th St, Chicago, Ill.
Refractory & Insulation Corp, 381 Fourth Ave, New York, N. Y.
Seaboard Refractories Co, Perth Amboy, N. J.
U. S. Stoneware Co, 62 E 42nd St, New York, N. Y.

CHAINS AND SPROCKETS, POWER-TRANSMITTING

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Morse Chain Co, Ithaca, N. Y.
Murray, D J, Mfg Co, Wausau, Wis.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Baldwin-Duckworth Chain Corp, Springfield, Mass.
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Boston Gear Works, Inc, North Quincy, Mass.
Bridgeport Chain & Mfg Co, Bridgeport, Conn.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Diamond Chain & Mfg Co, 444 Kentucky Ave, Indianapolis, Ind.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio.
McKay Co, York, Pa.
Medart Co, 3548 DeKalb St, St. Louis, Mo.
Ramsey Chain Co, Inc, 1010 Broadway, Albany, N. Y.
Robinson Mfg Co, Muncy, Pa.
Union Chain & Mfg Co, Sandusky, Ohio.
Watson-Flagg Machine Co, 833-863 E 25th St, Paterson, N. J.

CHECK VALVES

(See Valves, Check)

CHEMICAL FEEDERS

(See Feeders, Chemical and Pumps, Proportioning)

CHIMNEYS, BRICK, CONCRETE

(See Also Stacks)
American Chimney Corp, 147 4th Ave, New York, N. Y.
Cutshall, J M, & Sons, Brazil, Ind.
Custodis, Alphons, Chimney Construction Co, 80 Broad St, New York, N. Y.
Summerhays, Wm, Sons Corp, Rochester, N. Y.
Weber Chimney Co, 332 S Michigan Ave, Chicago, Ill.

CIRCUIT BREAKERS

(See Breakers, Circuit)

CLAMPS, PIPE

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Jarecki Mfg Co, Erie, Pa.
Smooth-On Mfg Co, D-30, 572 Communipaw Ave, Jersey City, N. J.
Aero Supply Mfg Co, Corry, Pa.
Diamond Power Expansion Bolt Co, Garwood, N. J.
Gaso Pump & Burner Mfg Co, Tulsa, Okla.
Stearns-Roger Mfg Co, Denver, Colo.

CLEANERS, BOILER-TUBE

Airetool Mfg Co, 308 S Center St, Springfield, Ohio
Elliott Co, Jeannette, Pa.
Huyette, Paul B, Co, Inc, 403 N Broad St, Philadelphia, Pa.
Jarecki Mfg Co, Erie, Pa.
Oakite Products Inc, 23 Thames St, New York, N. Y.
Roto Co, 145 Sussex Ave, Newark, N. J.
Wilson, Thomas C, Inc, 57 Vandam St, New York, N. Y.

Boiler Equipment Trust, North Amherst, Mass.
General Specialty Co, Inc, 67 Carroll St, Buffalo, N. Y.
Haering, D W, & Co, 2306 S Winchester, Chicago, Ill.
Pierce, Wm B, Co, Caxton Bldg, Buffalo, N. Y.
Pilley Packing & Flue Brush Mfg Co, St. Louis, Mo.
Robertson, Jas L, 3rd, 116 Broad St, New York, N. Y.
Spencer Turbine Co, 488 New Park Ave, Hartford, Conn.

CLEANERS, HEAT-EXCHANGER, TUBE

Airetool Mfg Co, 308 S Center St, Springfield, Ohio.
Condenser Service & Engrg Co, 310 12th St, Hoboken, N. J.
Elliott Co, Jeannette, Pa.
Oakite Products Inc, 23 Thames St, New York, N. Y.
Roto Co, 145 Sussex Ave, Newark, N. J.
Wilson, Thomas C, Inc, 57 Vandam St, New York, N. Y.

CLEANING SYSTEMS, VACUUM

Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Allen Billmyre Corp, Daily News Bldg, New York, N. Y.
Boiler Equipment Trust, North Amherst, Mass.
Breuer Electric Mfg Co, 5100 N Ravenswood Ave, Chicago, Ill.
Holly Pneumatic Systems, Dept 15, 15 E 40th St, New York, N. Y.
Roots-Connersville Blower Corp, Connersville, Ind.
Spencer Turbine Co, 488 New Park Ave, Hartford, Conn.
United Conveyor Corp, Dearborn & Van Buren Sts, Chicago, Ill.
U. S. Hoffman Machinery Corp, 105 4th Ave, New York, N. Y.

CLOCKS, PROGRAM

(See Controllers, Time-Cycle)

CLOTH, ASBESTOS

(See Asbestos Products)

CLUTCHES, AUTOMATIC

American Clutch Equipment Co, Clifton, N. J.
Automatic Clutch Co, Chicago, Ill.
Dawes Equipment, Inc, 2280 Penobscot Bldg, Detroit, Mich.
Dickson Automatic Clutch Co, Los Angeles, Calif.
Fast, Gustav, Engrg Co, Annapolis, Md.
Madden, J P, Bethlehem, Pa.
Washburn Shops, Worcester, Mass.

CLUTCHES, FRICTION

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Hilliard Corp, 4 W 4th St, Elmira, N. Y.
Jones, W A, Foundry & Machine Co, 4423 W Roosevelt Rd, Chicago, Ill.
Morse Chain Co, Ithaca, N. Y.
Murray, D J, Mfg Co, Wausau, Wis.
Reeves Pulley Co, 1000 N Reed St, Columbus, Ind.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Brown Engineering Co, 123 E 3rd St, Reading, Pa.
Caldwell, W E, Co, Inc, 280 Brandeis St, Louisville, Ky.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Conway Clutch Co, Cincinnati, O.
Dodge Mfg Corp, Mishawaka, Ind.
Falls Clutch & Machinery Co, Cuyahoga Falls, Ohio.
Farrel-Birmingham Co, Ansonia, Conn.
Foote Bros Gear & Machine Co, Western Blvd, Chicago, Ill.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Hill Clutch Machine & Foundry Co, 6400 Breakwater Ave, Cleveland, Ohio.
Johnson, Carlyle, Machine Co, 52½ Main St, Manchester, Conn.
Kinney Mfg Co, Washington St, Boston, Mass.
McMahon & Co, Worcester, Mass.
Medart Co, 3548 DeKalb St, St. Louis, Mo.
Ramsey Chain Co, Inc, 1010 Broadway, Albany, N. Y.
Rockford Drilling Machine Div, Borg-Warner Corp, 114 Catherine St, Rockford, Ill.
St Regis Paper Co, Engrg & Mach Div, Mitchell St, Oswego, N. Y.
Sprout, Waldron & Co, Muncy, Pa.
Twin Disc Clutch Co, Racine, Wis.
Watson-Flagg Machine Co, Paterson, N. J.
Wood's, T B, Sons Co, 1165 5th Ave, Chambersburg, Pa.

CLUTCHES, MAGNETIC

Cutler-Hammer, Inc, 606 N 12th St, Milwaukee, Wis.
Dings Magnetic Separator Co, Milwaukee, Wis.
Stearns Magnetic Mfg Co, Milwaukee, Wis.

CLUTCHES, OVERRUNNING

Hilliard Corp, 4 W 4th St, Elmira, N. Y.
Morse Chain Co, Ithaca, N. Y.

COAL

General Coal Co, 2500 Fidelity-Philadelphia Trust Bldg, Philadelphia, Pa.
Koppers Coal Co, Pittsburgh, Pa.
Peale, Peacock & Kerr, 420 Lexington Ave, New York, N. Y.
Pittsburgh Coal Co, Pittsburgh, Pa.
Appalachian Coals, Inc, Cincinnati, Ohio.
Berwind-White Coal Mining Co, 1 Broadway, New York, N. Y.
Consolidation Coal Co, 30 Rockefeller Plaza, New York, N. Y.
North American Coal Co, Cleveland, Ohio.
Pennsylvania Coal & Coke Corp, 70 E 45th St, New York, N. Y.
Valley Camp Coal Co, Cleveland, Ohio.

COAL METERS

(See Meters, Coal)

COATINGS, BOILER DRUM AND TUBES

Dampney Co of America, 1243 River St, Hyde Park, Mass.

COATINGS, HEAT-, CORROSION RESISTANT

Dampney Co of America, 1243 River St, Hyde Park, Mass.
Thurmalox Co, 3109 N Broad St, Philadelphia, Pa.
Cheesman-Elliot Co, 647 Kent Ave, Brooklyn, New York

COILS, PIPE, TUBING

American Blower Corp, 6000 Russell St, Detroit, Mich.
Grinnell Co, 377 W Exchange St, Providence, R. I.
Harrisburg Steel Corp, Harrisburg, Pa.
Midwest Piping & Supply Co, 1450 S 2nd St, St. Louis, Mo.
National Valve & Mfg Co, 3102 Liberty Ave, Pittsburgh, Pa.
Pittsburgh Piping & Equipt Co, 12 43rd St, Pittsburgh, Pa.
Power Piping Div, Blaw-Knox Co, 1525 Pennsylvania Ave, Pittsburgh, Pa.
Shaw, B F, Co, 509 E 2nd St, Wilmington, Del.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Bell & Gossett Co, 3000 Wallace St, Chicago, Ill.
California Steel Products Co, San Francisco, Calif.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
Duriron Co, Inc, Dayton, Ohio.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Hamilton Copper & Brass Works, Hamilton, Ohio.
Harris, Arthur & Co, N Aberdeen St, Chicago, Ill.
Howe Ice Machine Co, 2821 Montrose Ave, Chicago, Ill.
Keating, E F, Pipe Bending Co, Inc, Hartford, Conn.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
National Pipe Bending Co, New Haven, Conn.
National Pipe & Mfg Co, Liberty Ave, Pittsburgh, Pa.
Parker Appliance Co, Cleveland, Ohio.
Pittsburgh Pipe Coil & Bending Co, Pittsburgh, Pa.
Rempe Co, 340 N Sacramento Blvd, Chicago, Ill.
Rome-Turney Radiator Co, 200 Lynch St, Rome, N. Y.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Wolverine Tube Co, Detroit, Mich.

COILS, REFRIGERATING

Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Harrisburg Steel Corp, Harrisburg, Pa.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Vogt, Henry Machine Co, 1001 W Ormsby St, Louisville, Ky.
Worthington Pump & Machinery Corp, Harrison, N. J.
Baker Ice Machine Co, Inc, Omaha, Neb.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
Howe Ice Machine Co, 2821 Montrose Ave, Chicago, Ill.
Keating, E F, Pipe Bending Co, Inc, Hartford, Conn.
National Pipe Bending Co, New Haven, Conn.
Parker Appliance Co, Cleveland, Ohio.
Phoenix Ice Machine Co, Cleveland, Ohio.
Pittsburgh Pipe Coil & Bending Co, Pittsburgh, Pa.
Rempe Co, 340 N Sacramento Blvd, Chicago, Ill.
Rome-Turney Radiator Co, 200 Lynch St, Rome, N. Y.

CHIMNEYS

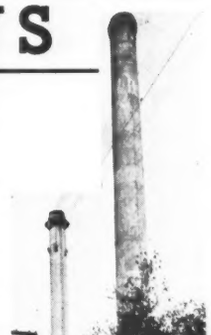
SPECIALISTS ON RADIAL BRICK CHIMNEYS — INDUSTRIAL WASTE BURNERS.

A COMPLETE CONSTRUCTION AND REPAIR SERVICE

Including design and complete construction of Radial Brick Chimneys, repairs to any type masonry chimney and line self supporting steel stacks.

Ask us to estimate on your requirements.

J. M. CUTSHALL & SONS
BRAZIL INDIANA



HOT STUFF

Calls for

"THUR-MA-LOX"

Patented—Reg. Trade Mark

HIGH HEAT RESISTING COATINGS

WRITE FOR NEW BULLETIN—P.T.

This time-proven product has been specified as "standard" by a wide range of important industrials for the continued protection of heated surfaces such as: stacks, breechings, fire and inspection doors, boiler fronts, blast furnaces, etc. Will not crack, peel nor deteriorate at temperatures up to 1600° F. Unaffected by cold, acid, oils or alkaline fumes. Furnished in black and aluminum in formulas compounded for various metal protecting requirements.

THURMALOX COMPANY
MANUFACTURERS
3109 N. BROAD ST. PHILADELPHIA

Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Typhoon Air Conditioning Co, 252 W 26th St, New York, N. Y.
Vesterdahl, Karl, & Co, 90 West St, New York, N. Y.
Vilter Mfg. Co, 2217 S 1st St, Milwaukee, Wis.
Wolverine Tube Co, Detroit, Mich.
York Ice Machry Corp, York, Pa.

COLD-STORAGE PLANTS

Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Baker Ice Machine Co, Inc, Omaha, Neb.
General Machry Co, Spokane, Wash.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

COLLECTORS, DUST

Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Diamond Power Specialty Corp, Box 288, Detroit, Mich.
Prat-Daniel Corp, 80 S Water St, Port Chester, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Allen Billmyre Corp, Daily News Bldg, New York, N. Y.
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Dracco Corp, 4083 E 116th St, Cleveland, Ohio.
Federal Pneumatic Systems, Inc, N Dearborn St, Chicago, Ill.
Holly Pneumatic Systems, Inc, Dept 15, 15 E 40th St, New York, N. Y.

CONDUITS

One Item of the Graybar 60,000
Clay—Fibre—Flexible and Rigid Steel. Heavywall and Thinwall. All types of fitting and conduit tools.

DISTRIBUTED BY
GraybaR ELECTRIC COMPANY
IN 83 PRINCIPAL CITIES

COMPRESSED AIR
By
SCHRAMM

—is Economical!

SMOOTH-VIBRATIONLESS OPERATION, SAVES FOUNDATION
SIZES TO MEET REQUIREMENTS, SAVES POWER
INTEGRAL FLUID COOLING, SAVES WATER
COMPACT DESIGN, SAVES FLOOR SPACE

Your Copy of Bulletin 3907 is Ready
It Fully Describes These Compressors

SCHRAMM INC.
758 E. VIRGINIA AVE. WEST CHESTER, PA.

Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, Ohio.
Pangborn Corp, P O Box 3089, Hagerstown, Md.
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.
Skinner Heating & Ventilating Co, 1990 N 9th, St. Louis, Mo.
Sly, W W, Mfg Co, Cleveland, O.
Spencer Turbine Co, 488 New Park Ave, Hartford, Conn.
Sprout, Waldron & Co, Muncy, Pa.
Steacy-Schmidt Mfg Co, York, Pa.
United Conveyor Corp, Dearborn & Van Buren Sts, Chicago, Ill.
Young & Bertke Co, 1040 Hulbert Ave, Cincinnati, Ohio

COLLECTORS, FLYASH

American Blower Corp, 6000 Russell St, Detroit, Mich.
Buell Engrg Co, Inc, 70 Pine St, New York, N. Y.
Prat-Daniel Corp, 80 S Water St, Port Chester, N. Y.
Research Corp, 405 Lexington Ave, New York, N. Y.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Western Precipitation Corp, 1016 W 9th, Los Angeles, Cal.
Bubar, Hudson H, 15 Park Row, New York, N. Y.
Green Fuel Economizer Co, 637 Main St, Beacon, N. Y.

COLUMNS, WATER

(See Water Columns)

COMPOUNDS, CONCRETE, RESURFACING

Flexrock Co, 23rd & Manning Sts, Philadelphia, Pa.
Truscon Laboratories, Detroit, Mich.

COMPOUNDS, GREASE-REMOVING

Oakite Products, Inc, 23 Thames St, New York, N. Y.
Barrett Co, 40 Rector St, New York, N. Y.
Detroit Rex Products Co, Hillview & Sorrento Aves, Detroit, Mich.
du Pont de Nemours, E I, & Co, Wilmington, Del.

COMPOUNDS, PIPE-JOINT

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Dixon, Joseph, Crucible Co, 170 Wayne Ave, Jersey City, N. Y.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Grinnell Co, Inc, Providence, R. I.
National Engineering Products, Inc, Commerce & Savings Bldg, Washington, D. C.
Smooth-On Mfg Co, D-30, 572 Communipaw Ave, Jersey City, N. J.
Key Co, Alta Sita, East St Louis, Ill.
Keystone Lubricating Co, 21st & Clearfield Sts, Phila, Pa.
Rockwood Sprinkler Co, 54 Harlow St, Worcester, Mass.
U. S. Graphite Co, Saginaw, Mich.
X-Pando Corp, 43–15 36th St, Long Island City, N. Y.

COMPOUNDS, RUST-PREVENTING

Dampney Co of America, 1243 River St, Hyde Park, Mass.
Dixon, Joseph, Crucible Co, 170 Wayne St, Jersey City, N. J.
Monsanto Chemical Co, St Louis, Mo.
Standard Oil Co, Ind., 910 S Michigan Ave, Chicago, Ill.
Thurmalox Co, 3109 N Broad St, Philadelphia, Pa.
Adkins, Young & Allen Co, S Jefferson St, Chicago, Ill.
Barrett Co, 40 Rector St, New York, N. Y.
Chemical Solvent Co, Box 487, Birmingham, Ala.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Haering, D W, & Co, 2306 S Winchester, Chicago, Ill.
Houghton, E F, & Co, 244–50 W Somerset St, Phila, Pa.
Inertol Co, Inc, 401 Broadway, New York, N. Y.
Keystone Lubricating Co, 21st & Clearfield, Phila, Pa.
North American Fibre Products Co, Cleveland, Ohio.
Parker Rust-Proof Co, E Milwaukee Ave, Detroit, Mich.
Standard Oil Co of N. J. 26 Broadway, New York, N. Y.
Wailes-Dove-Hermiston Corp, 17 Battery Place, New York, N. Y.
Whiting Leather & Belting Co, Long Island City, N. Y.

COMPOUNDS, RUST-REMOVING

Oakite Products, Inc, 23 Thames St, New York, N. Y.
McVicker, W B, Co, Douglass St, Brooklyn, N. Y.

COMPOUNDS, SLUSHING

Houghton, E F, & Co, 244–50 W Somerset St, Philadelphia, Pa.
Ironsides Co, Columbus, Ohio.
Swan-Finch Oil Corp, 1250 6th Ave, New York, N. Y.
Warren Bros Roads Co, Cambridge, Mass.

COMPOUNDS, WATERPROOFING

Johns-Manville, 22 E 40th St, New York, N. Y.
Barrett Co, 40 Rector St, New York, N. Y.
du Pont de Nemours, E I, & Co, Wilmington, Del.
Koppers Co, Pittsburgh, Pa.
North American Fibre Products Co, Cleveland, Ohio.
Sonneborn, L, Sons, Inc, 88 Lexington Ave, New York, N. Y.
Toch Bros, Inc, 2600 Richmond Terrace, Staten Island, N. Y.
Tropical Paint & Oil Co, Cleveland, Ohio.
Truscon Labs, Detroit, Mich.
Wailes Dove-Hermiston Corp, 17 Battery Place, New York, N. Y.

COMPRESSOR VALVES

(See Valves, Pump & Compressor)

COMPRESSORS, AIR, GAS

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Chicago Pneumatic Tool Co, 6–8 E 44th St, New York, N. Y.
De Laval Steam Turbine Co, Trenton, N. J.
Elliott Co, Jeannette, Pa.
Fuller Co, 111 Bridge St, Catasauqua, Pa.
Gardner-Denver Co, 100 Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Nordberg Mfg Co, 3703 S Chase Ave, Milwaukee, Wis.
Pennsylvania Pump & Compressor Co, Easton, Pa.
Schramm, Inc, 758 E Virginia Ave, West Chester, Pa.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Worthington Pump & Machinery Corp, Harrison, N. J.
Allen Billmyre Corp, Daily News Bldg, New York, N. Y.
American-Marsh Pumps, Inc, 60 Capitol Ave, N E, Battle Creek, Mich.
Brunner Mfg Co, 1821 Broad St, Utica, N. Y.
Bury Compressor Co, Erie, Pa.
Cooper-Bessemer Corp, Mount Vernon, Ohio.
Crowell Mfg Co, 319 Franklin Ave, Brooklyn, N. Y.
Hardie-Tynes Mfg Co, Birmingham, Ala.
Hobart Bros Co, Troy, Ohio.
Kraissl Co, Hackensack, N. J.
Le Roi Co, Milwaukee, Wis.
Mesta Machine Co, Pittsburgh, Pa.
Nash Engrg Co, S Norwalk, Conn.
National Steam Pump Co, Upper Sandusky, Ohio.
National Transit Pump & Machine Co, Oil City, Pa.
O K Clutch & Machinery Co, Columbia, Pa.
Oliver United Filters, Inc, 2900 Glascock St, Oakland, Calif.

Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Quincy Compressor Co, Quincy, Ill.
Roots-Connersville Blower Corp, Connersville, Ind.
Spencer Turbine Co, 488 New Park Ave, Hartford, Conn.
Sullivan Machinery Co, Michigan City, Ind.
Westinghouse Air Brake Co, Wilmerding, Pa.
Wright Mfg Div of American Chain Co, Inc, York, Pa.
Yeomans Bros Co, 1446 Dayton St, Chicago, Ill.
York Ice Machry Corp, York, Pa.

COMPRESSORS, REFRIGERATION

Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Baker Ice Machine Co, Inc, Omaha, Neb.
Brunner Mfg Co, 1821 Broad St, Utica, N. Y.
Carrier Corp, Syracuse, N. Y.
General Machry Co, Spokane, Wash.
Howe Ice Machine Co, 2821 Montrose Ave, Chicago, Ill.
Phoenix Ice Machine Co, Cleveland, Ohio.
Roots-Connersville Blower Corp, Connersville, Ind.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Vesterdahl, Karl, & Co, 90 West St, New York, N. Y.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

CONDENSER TUBES

(See Tubes, Condenser)

Look for the noun in the product listing, for example:
"Conduit, Electrical"
not
"Electrical Conduit"

CONDENSERS, EVAPORATIVE

Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Frick Co, 325 Broadway, Waynesboro, Pa.
Worthington Pump & Machinery Co, Harrison, N. J.
Baker Ice Machine Co, Inc, Omaha, Neb.
Carrier Corp, Syracuse, N. Y.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Niagara Blower Co, Buffalo, N. Y.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
York Ice Machry Co, York, Pa.

CONDENSERS, JET

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Chicago Pneumatic Tool Co, 6–8 E 44th St, New York, N. Y.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Croll-Reynolds Engrg Co, 17 John St, New York, N. Y.
Dean Brothers Co, Indianapolis, Ind.
Ross Heater & Mfg Co, 1409 West Ave, Buffalo, N. Y.
Schubert-Christy Corp, 1600 Georgia St, Affton Station, St. Louis, Mo.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.

CONDENSERS, REFRIGERATION

(See also Refrigerating Systems)

Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Worthington Pump & Machinery Corp, Harrison, N. J.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
Alco Products Div, 36 Church St, New York, N. Y.
Andale Co, Philadelphia, Pa.
Baker Ice Machine Co, Inc, Omaha, Neb.
Carrier Corp, Syracuse, N. Y.
Howe Ice Machine Co, 2821 Montrose Ave, Chicago, Ill.
Lummus Co, 420 Lexington Ave, New York, N. Y.
McCord Radiator & Mfg Co, Detroit, Mich.
Rome-Turney Radiator Co, 200 Lynch St, Rome, N. Y.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Vesterdahl, Karl, & Co, 90 West St, New York, N. Y.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Mach Corp, York, Pa.

CONDENSERS, SURFACE

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Condenser Service & Engrg Co, 310 12th St, Hoboken, N. J.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Braun, C F, & Co, 1000 S Fremont Ave, Alhambra, Calif.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schubert-Christy Corp, 1600 Georgia St, Affton Station, St Louis, Mo.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.

CONDUIT-BENDING MACHINES

(See Pipe-Bending Machines)

CONDUIT, ELECTRICAL

General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Steel & Tubes Div, 218 E 131st St, Cleveland, Ohio.
Continental-Diamond Fibre Co, Newark, Del.
Republic Steel Corp, Cleveland, Ohio.

CONDUIT, METAL, FLEXIBLE

(See Tubing, Metal, Flexible)

CONDUIT, STEAM

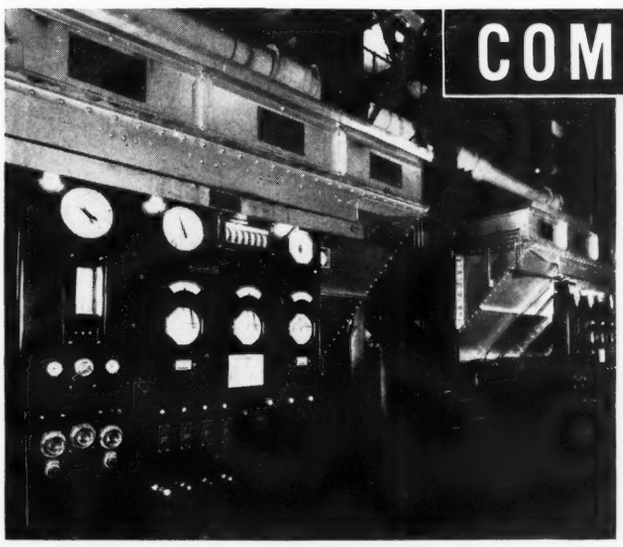
(See Underground Steam Conduit)

CONDUIT, WOOD

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Wyckoff Pipe & Creosoting Co, 522 5th Ave, New York, N. Y.

CONTROL SYSTEMS, COMBUSTION

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio.
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Engineer Co, 17 Battery Place, New York, N. Y.



COMBUSTION CONTROL

All Sizes of Boilers All Types of Firing

Low steam costs are the result of high boiler efficiency. Daily performance at test efficiencies will result from the installation of a Republic-Smoot combustion control system. They are designed for all sizes of boilers and all types of fuel firing equipment.

CONSTANT STEAM PRESSURE
Automatically maintains a constant steam pressure by controlling the fuel and air input to the boilers in balance with the boiler load.

EFFICIENT COMBUSTION
Automatically maintains maximum combustion efficiency over entire range of boiler rating, by controlling simultaneously the fuel and air input to boiler in measured proportions and in a fixed ratio.

LOAD DISTRIBUTION
Automatically distributes load equally among all the boilers, or the load can be distributed between the boilers as desired.

TYPICAL INSTALLATIONS

R. C. A. MANUFACTURING CO.
PENICK & FORD, LTD. INC.
JACOB RUPPERT BREWING CO.
W. VIRGINIA PULP & PAPER CO.
BEECHNUT PACKING CO.
TIMKEN ROLLER BEARING CO.
CELANESE CORP.
SWIFT & CO.
KREY PACKING CO.
U. S. MILITARY ACADEMY
U. S. NAVAL ACADEMY
STEVENS HOTEL

FOR COMPLETE DETAILS WRITE FOR DATA BOOK No. S-21

REPUBLIC FLOW METERS CO. 2222 DIVERSEY PKWY. CHICAGO, ILLINOIS

Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Hays Corp, 905 8th St, Michigan City, Ind.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Askania Regulator Co, S Michigan Ave, Chicago, Ill.
Defender Automatic Regulator Co, St. Louis, Mo.
Morey & Jones, Ltd, Los Angeles, Calif.
Shallcross Controls, Inc, 121 N Broadway, Milwaukee, Wis.
Weeks Merit System, Inc, 228 Aborn St, Providence, R. I.

CONTROL SYSTEMS, HEAT, HOT-WATER, AUTOMATIC

Burling Instrument Co, 2 Belmont Ave, Newark, N. J.
Cleveland Steel Products Corp, Wellington, Ohio.
Detroit Lubricator Co, 5842 Trumbull Ave, Detroit, Mich.
Friez, Julien P, & Sons, Inc, Central Ave, Baltimore, Md.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Mueller Co, Decatur, Ill.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.

CONTROLLERS, ELECTRICAL

(See Also Regulators)
Allis-Chalmers Mfg Co, Milwaukee, Wis.
Cutler-Hammer Inc, 806 N 12th St, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Monitor Controller Co, Lombard & Gay Sts, Baltimore, Md.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Allen-Bradley Co, Milwaukee, Wis.
Arrow-Hart & Hegeman Elec Co, 105 Hawthorn St, Hartford, Conn.
Clark Controller Co, Cleveland, Ohio
Electric Controller & Mfg Co, Cleveland, Ohio
Goodman Mfg Co, S Halsted St, Chicago, Ill.
Rowan Controller Co, 2313 Homewood Ave, Baltimore, Md.
Square D Co, Rivard & Piquette Sts, Detroit, Mich.

CONTROLLERS, TIME-CYCLE

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Taylor Instrument Cos, Rochester, N. Y.
Automatic Temperature Control Co, Germantown Ave & Logan St, Philadelphia, Pa.
International Business Mach Co, 590 Madison, New York, N. Y.

CONVERTERS, ROTARY, ELECTRIC

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Erie Electric Co, 124 Church St, Buffalo, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Century Electric Co, 1806–12 Pine St, St Louis, Mo.
Diehl Mfg Co, Elizabeth, N. J.
Forbes & Myers, 174 Union St, Worcester, Mass.
Janette Mfg Co, 556 W Monroe St, Chicago, Ill.

CONVEYING SYSTEMS, HYDRAULIC

Allen-Sherman-Hoff Co, 227 S 15 St, Philadelphia, Pa.
National Conveyors Co, Inc, 50 Church St, New York, N. Y.
United Conveyor Corp, Dearborn & Van Buren Sts, Chicago, Ill.

CONVEYING SYSTEMS, PNEUMATIC OR STEAM-JET

Allen-Sherman-Hoff Co, 227 S 15 St, Philadelphia, Pa.
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Allen Billmyre Corp, Daily News Bldg, New York, N. Y.
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Dracco Corp, 4083 E 116 St, Cleveland, Ohio
Hahn Engineering Co, 30 Church St, New York, N. Y.
Holly Pneumatic Systems, Inc, Dept 15, 15 E 40th St, New York, N. Y.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
National Conveyors Co, 50 Church St, New York, N. Y.
Skinner Heating & Ventilating Co, 1990 N 9th St, St Louis, Mo.
United Conveyor Corp, Dearborn & Van Buren Sts, Chicago, Ill.
Young & Bertke Co, 1040 W Hulbert Ave, Cincinnati, Ohio

CONVEYORS, BELT

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Murray, D J, Mfg Co, Wausau, Wis.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Alvey Ferguson Co, Cincinnati, Ohio
Barber-Greene Co, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Columbus Conveyor Co, Columbus, Ohio.
Elgin Mfg Co, Elgin, Ill.
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio.
Farquhar, A B, Co, York, Pa.
General Conveyor Co, 38-40 22nd St, Long Island City, N. Y.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Goodman Mfg Co, Halstead St & 48th Place, Chicago, Ill.
Great Western Mfg Co, Leavenworth, Kansas.
Hartford-Empire Co, Hartford, Conn.
Haslett Chute & Conveyor Co, Oaks, Pa.
Jeffrey Mfg Co, 932-99 N Fourth St, Columbus, Ohio.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Lamson Co, Syracuse, N. Y.
Logan Co, Louisville, Ky.
Mathews Conveyor Co, Ellwood City, Pa.
Norfolk Iron Co, North Quincy, Mass.
Palmer-Bee Co, Detroit, Mich.
Robinson Mfg Co, Muncy, Pa.
Sprout, Waldon & Co, Muncy, Pa.
Standard Conveyor Co, N St. Paul, Minn.

CONVEYORS, FEEDER

Link-Belt Co, 306 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Farquar, A B, Co, York, Pa.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Jeffrey Mfg Co, 932–99 N 4th St, Columbus, Ohio
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Palmer-Bee Co, Detroit, Mich.

CONVEYORS, PORTABLE

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Alvey-Ferguson Co, Cincinnati, Ohio
Barber-Greene Co, Aurora, Ill.
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio.
Farquhar, A B, Co, York, Pa.
Godfrey Conveyor Co, Dept A 77, Elkhart, Ind.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio.
Lamson Co, Syracuse, N. Y.
Logan Co, Louisville, Ky.
Standard Conveyor Co, N St. Paul, Minn.

CONVEYORS, SCRAPER, BUCKET, SCREW, FLIGHT, DRAG

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Murray, D J, Mfg Co, Wausau, Wis.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Sauerman Bros Inc, 462 S Clinton St, Chicago, Ill.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Alvey-Ferguson Co, Cincinnati, Ohio
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Columbus Conveyor Co, Columbus, Ohio.
Farquhar, A B, Co, York, Pa.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Godfrey Conveyor Co, Dept A 77, Elkhart, Ind.
Goodman Mfg Co, Halstead St & 48th Place, Chicago, Ill.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Lamson Co, Syracuse, N. Y.
Logan Co, Louisville, Ky.
Palmer-Bee Co, Detroit, Mich.
Reading Chain & Block Corp, 2100 Adams St, Reading, Pa.
Standard Conveyor Co, N St. Paul, Minn.
Webster Mfg Inc, Tiffin, Ohio.

COOLERS, BRINE

(See Also Heat Exchangers)
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Worthington Pump & Machinery Corp, Harrison, N. J.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
Andale Co, Philadelphia, Pa.
Baker Ice Machine Co, Inc, Omaha, Neb.
Davis Engrg Corp, 1064-16 E Grand St, Elizabeth, N. J.
Griscom-Russell Co, 385 Madison Ave, New York, N. Y.
Howe Ice Machine Co, 2821 Montrose Ave, Chicago, Ill.
Lummus Co, 420 Lexington Ave, New York, N. Y.
Richmond Engrg Co, Inc, Seventh & Hospital Sts, Richmond, Va.
Vesterdahl, Karl, & Co, 90 West St, New York, N. Y.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

COOLERS, OIL

Condenser Service & Engrg Co, 310 12th St, Hoboken, N. J.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Worthington Pump & Machinery Corp, Harrison, N. J.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
Alco Products Div, 36 Church St, New York, N. Y.
Andale Co, Philadelphia, Pa.
Bell & Gossett Co, Chicago, Ill.
Burt Mfg Co, 232 Main St, Akron, Ohio
Davis Engrg Corp, 1064-16 E Grand St, Elizabeth, N. J.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Harrison Radiator Co, Lockport, N. Y.
Lummus Co, 420 Lexington Ave, New York, N. Y.
Rome-Turney Radiator Co, 200 Lynch St, Rome, N. Y.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Skinner Purifiers Co, 2231 Dalzelle St, Detroit, Mich.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.
York Ice Machry Corp, York, Pa.
Young Radiator Co, Racine, Wis.

COOLERS, UNIT, ROOM

Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Clarage Fan Co, 621 Porter St, Kalamazoo, Mich.
Murray, D J, Mfg Co, Wausau, Wis.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Howe Ice Machine Co, 2821 Montrose Ave, Chicago, Ill.
Rempe Co, 340 N Sacramento Blvd, Chicago, Ill.
Skinner Heating & Ventilating Co, 1990 N 9th, St. Louis, Mo.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
York Ice Mach Corp, York, Pa.
Young Radiator Co, Racine, Wis.

COOLING SYSTEMS, SPRAY

Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.

COMBUSTION CONTROL

METERMAX UNIT CONTROL SYSTEM

Regulates fuel and air to boiler furnace so as to meet load requirements, maintain high efficiency and, on multiple-furnace installations, maintain proper rate of combustion at each furnace. Control panel is supplied as a unit, assembled and connected at factory; consists of pneumatic master-controller and pneumatic-electric individual controllers for fuel, air and furnace pressure. Drive units are electrical. Push-button control can be instantly substituted for full automatic at any time.

Write for catalog.

LEEDS & NORTHRUP COMPANY
4987 Stenton Avenue, Philadelphia, Pa.

LEEDS & NORTHRUP

Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kans.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.
Binks Mfg Co, 3114-40 Carroll Ave, Chicago, Ill.
Carrier Corp, Syracuse, N. Y.
Schubert-Christy Corp, 1600 Georgia St, St. Louis, Mo.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Spray Engrg Co, 111 Central St, Somerville, Mass.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.

COOLING TOWERS

(See Towers, Cooling)

CORK PRODUCTS

Armstrong Cork Co, Industrial Div, Lancaster, Pa.
Cork Insulation Co, 155 E 44th St, New York, N. Y.
Mundet Cork Corp, 65 S 11th St, Brooklyn, N. Y.
United Cork Cos, Kearny, N. J.

COUNTERS, REVOLUTION

Bristol Co, Waterbury, Conn.
Durant Mfg Co, N Buffum St, Milwaukee, Wis.
Lonergan, J E, Co, Philadelphia, Pa.
Veeder-Root Inc, Hartford, Conn.

COUPLINGS, COMPRESSION

(See Fittings, Tube)

COUPLINGS, PIPE

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Harrisburg Steel Corp, Harrisburg, Pa.
Jarecki Mfg Co, Erie, Pa.
Kennedy Valve Mfg Co, Elmira, N. Y.
Taylor Forge & Pipe Works, P O Box 485, Chicago, Ill.
Central Forging Co, Catawissa, Pa.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
Dresser Mfg Co, Bradford, Pa.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
Malleable Iron Fittings Co, Branford, Conn.
Parker Appliance Co, Euclid Ave, Cleveland, Ohio.
Pittsburgh Valve & Fittings Corp, Barberton, Ohio.
Sherman, H B, Mfg Co, Battle Creek, Mich.
Victaulic Co of America, 30 Rockefeller Plaza, New York, N. Y.

COUPLINGS, SHAFT, FLEXIBLE

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Bartlett Hayward Div, Koppers Co, 212 Scott St, Baltimore, Md.
De Laval Steam Turbine Co, Trenton, N. J.
Jones, W A, Foundry & Machine Co, 4423 W Roosevelt Rd, Chicago, Ill.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Morse Chain Co, Ithaca, N. Y.
Philadelphia Gear Works, Erie Ave & G St, Philadelphia, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Ajax Flexible Coupling Co, 11 English St, Westfield, N. Y.
American Flexible Coupling Co, Erie, Pa.
Bond, Chas, Co, Phila, Pa.
Boston Gear Works, Inc, North Quincy, Mass.
Brown, A & F, Co, Elizabethport, N. J.
Brown Engrg Co, 123 E Third St, Reading, Pa.
Bruce-Macbeth Engine Co, 2111 Center St, N W, Cleveland, Ohio.
Clark Controller Co, Cleveland.
Cullman Wheel Co, Altgeld St, Chicago, Ill.
Diamond Chain & Mfg Co, 444 Kentucky Ave, Indianapolis, Ind.
Dodge Mfg Co, Mishawaka, Ind.
F A B Mfg Co, Inc, Oakland, Calif.
Falk Corp, 3104 W Canal St, Milwaukee, Wis.
Falls Clutch & Machinery Co, Cuyahoga Falls, Ohio.
Farrel-Birmingham Co, Inc, Ansonia, Conn.
Foote Bros Gear & Machine Co, Western Blvd, Chicago, Ill.
Frederick Iron & Steel Co, Frederick, Md.
Gears & Forgings, Inc, Cleveland, Ohio.
Hill Clutch Machine & Foundry Co, Cleveland, Ohio.
Ideal Electric & Mfg Co, Mansfield, Ohio.
James, D O, Mfg Co, W Monroe, Chicago, Ill.
Lovejoy Flexible Coupling Co, West Lake St, Chicago, Ill.
Medart Co, 3548 DeKalb St, St. Louis, Mo.
Meriam Co, Cleveland, Ohio
Mesta Machine Co, Pittsburgh.
Palmer-Bee Co, Detroit, Mich.
Poole Foundry & Machine Co, Baltimore, Md.
Ramsey Chain Co, Inc, 1010 Broadway, Albany, N. Y.
Smith, T L, Co, Milwaukee, Wis.
Smith & Serrell, 20 Washington Place, Newark, N. J.
Spicer Mfg Corp, Toledo, Ohio.
Thomas Flexible Coupling Co, Warren, Pa.
Universal Gear Corp, 1477 E 19th St, Indianapolis, Ind.
Union Chain & Mfg Co, Sandusky, Ohio.
Waldron, John, Corp, Box 110, New Brunswick, N. J.
Webster & Weller Mfg Cos, 1856 N Kostner, Chicago, Ill.
Wood's, T B, Sons Co, 1165 5th Ave, Chambersburg, Pa.

COUPLINGS, VARIABLE-SPEED

American Blower Corp, 6000 Russell St, Detroit, Mich.
Electric Machinery Mfg Co, 1331 Tyler St, N E, Minneapolis, Minn.

COUPLINGS, TUBE

(See Fittings, Tube)

COVERING, PIPE

(See Insulation)

CRANES, ELECTRIC TRAVELING

Chisholm-Moore Hoist Corp, 6015 Fremont, Tonawanda, N. Y.
Cleveland Crane & Engrg Co, Wickliffe, Ohio.
Euclid Crane & Hoist Co, Euclid, Ohio.
Harnischfeger Corp, Milwaukee, Wis.
Lakeside Bridge & Steel Co, Milwaukee, Wis.
Lane Mfg Co, Montpelier, Vt.
Link-Belt Speeder Corp, 307 N Michigan Ave, Chicago, Ill.
Morgan Engrg Co, Alliance, Ohio.
Northern Engrg Works, Detroit, Mich.
Reading Chain & Block Corp, 2100 Adams St, Reading, Pa.
Roeper Crane & Hoist Works, 1729 N 10th St, Reading, Pa.
Shaw-Box Crane & Hoist Div, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp, 453 Schuyler Ave, Montour Falls, N. Y.
Whiting Corp, 15657 Lathrop Ave, Harvey, Ill.

CRANES, HAND-POWER

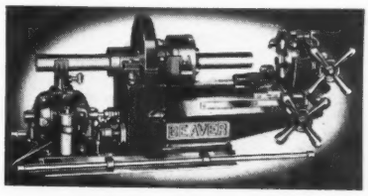
Bradney Machine Co, Inc, Middletown, N. Y.
Chisholm-Moore Hoist Corp, 6015 Fremont, Tonawanda, N. Y.
Detroit Hoist & Machine Co, Detroit, Mich.
Euclid Crane & Hoist Co, Euclid Ohio.
Harrington Co, 17th & Callowhill Sts, Philadelphia, Pa.
Industrial Brownhoist Corp, Bay City, Mich.
Louden Machinery Co, Fairfield, Iowa.
Northern Engrg Works, Detroit.
Palmer-Bee Co, Detroit, Mich.
Reading Chain & Block Corp, 2100 Adams St, Reading, Pa.
Robbins & Myers, Inc, Springfield, Ohio.
Roeper Crane & Hoist Works, 1729 N 10th St, Reading, Pa.
Shaw-Box Crane & Hoist Div, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp, 453 Schuyler Ave, Montour Falls, N. Y.
Whiting Corp, 15657 Lathrop Ave, Harvey, Ill.
Wright Mfg Div of American Chain Co, Inc, York, Pa.
Yale & Towne Mfg Co, Phila, Pa.

Save this Issue!

It is a reference book for all of 1940. You will have occasion to use it again and again.

File It Handy to Your Working Desk

The A-B-C of Pipe Machines!



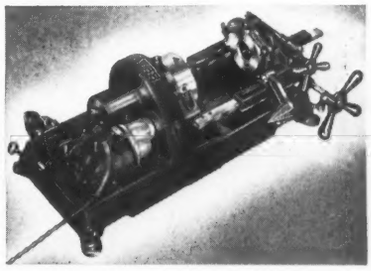
Model-A

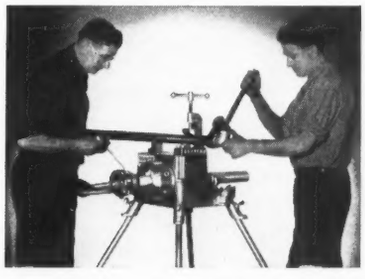
A high-speed heavy-duty deluxe Pipe and Bolt Machine. Range ⅛ to 2-inch—up to 12-inch with geared tools and drive shaft. Bolts, ¼ to 2-inch. From $309.50 up. Weight 415 lbs. Ask for Bulletin-A.

Model-B

Big Brother to Model-C Power Unit

A light-weight utility Pipe and Bolt Machine combining many features of Model-A with the easy portability of Model-C. Range ⅛ to 2-inch—up to 8-inch with drive shaft and geared tools. Bolts up to 1½-inch. Weight 250 lbs. From $217.50 up. Ask for Bulletin-B.





Model-C

A sturdy little Power Unit

Converts hand pipe tools into power tools from ⅛ to 8-inch. Threads 8-inch in 6 minutes. Threads bolts up to 1½-inch. Two men can work at the same time without interference. Weight 150 lbs. From $127.50 up. Ask for Bulletin-C.

BEAVER PIPE TOOLS

Highest Quality • WARREN, OHIO • *For 40 Years*

140 Power Ave.

CRUSHERS, COAL

American Pulverizer Co, 1029 Macklind Ave, St. Louis, Mo.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Koppers Co, Pittsburgh, Pa.
Sturtevant Mill Co, Harrison Sq, Dorchester, Boston, Mass.
Vulcan Iron Works, 750 S Main St, Wilkes-Barre, Pa.
Webster Mfg Inc, Tiffin, Ohio.

CUPS, GREASE

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Hunter Pressed Steel Co, 8000 Maple Ave, Lansdale, Pa.
Jarecki Mfg Co, Erie, Pa.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Lonergan, J E, Co, Philadelphia, Pa.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, Ohio.
Powell, Wm, Co, Cincinnati, Ohio
Bowen Products Corp, Auburn, N. Y.
Keystone Lubricating Co, 21st & Clearfield Sts, Phila, Pa.
Nathan Mfg Co, 250 Park Ave, New York, N. Y.
Stewart-Warner Corp, 1826-1852 Parkway, Chicago, Ill.
Williams, D T, Valve Co, 2854 Spring Grove Ave, Cincinnati, Ohio.

CUTTERS, BOILER-TUBE

Faessler, J, Mfg Co, Moberly, Mo.
Landis Machine Co, Waynesboro, Pa.
Wiedeke, Gustav, Co, Dayton, Ohio.

CUTTING & THREADING MACHINES, PIPE

Beaver Pipe Tools, Inc, 310 Power Ave, Warren, Ohio
Jarecki Mfg Co, Erie, Pa.
Toledo Pipe Threading Machine Co, 1431 S Summit St, Toledo, Ohio
Bignall & Keeler Mach Works, 512 Leclaire Ave, Edwardsville, Ill.
Cox & Sons Co, South Bridgeton, N. J.
Curtis & Curtis Co, 302 Garden St, Bridgeport, Conn.
Landis Machine Co, Waynesboro, Pa.
Oster Mfg Co, Cleveland, Ohio
Ridge Tool Co, Elyria, Ohio

DEALERS, EQUIPMENT

(See Classified Index in Searchlight Section)

DESUPERHEATERS

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Andale Co, Philadelphia, Pa.
Mercon Regulator Co, 2357 N 29th St, Milwaukee, Wis.
Schutte & Koerting Co, Phila, Pa.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.

DETECTORS, REFRIGERANT-GAS

Linde Air Products Co, 30 E 42nd St, New York, N. Y.
Imperial Brass Mfg Co, 564 S Racine Ave, Chicago, Ill.
Turner Brass Co, Sycamore, Ill.

DIAPHRAGM VALVES

(See Valves, Diaphragm)

DC GENERATORS

(See Generators, Electric)

DC MOTORS

(See Motors, Electric)

DIESEL ENGINES

(See Engines, Oil)

DRESSERS, COMMUTATOR

Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Grobet File Corp of America, 3 Park Place, New York, N. Y.
Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.
Martindale Electric Co, 1385 Hird Ave, Cleveland, Ohio

DRESSING, BELT

Dixon, Joseph, Crucible Co, 170 Wayne St, Jersey City, N. J.
Rhoads, J E, & Sons, 35 N Sixth St, Philadelphia, Pa.
American Asphalt Paint Co, 43 E Ohio St, Chicago, Ill.
Cling-Surface Co, Buffalo, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Houghton, E F, & Co, 244-50 W Somerset St, Philadelphia, Pa.
Pennwell Oil & Belting Co, 5 White St, New York, N. Y.
Philadelphia Belting Co, 6th & Spring Garden Sts, Phila, Pa.
Raniville, F, Co, Grand Rapids, Mich.
Schieren, Chas A, Co, 30-39 Ferry St, New York, N. Y.

DRIERS, COAL

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
American Process Co, Sea Girt, N. J.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Bos-Hatten, Inc, Buffalo, N. Y.
Hardinge Co, Inc, 240 Arch St, York, Pa.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Koppers Co, Pittsburgh, Pa.

DRILLS, PNEUMATIC, ELECTRIC, PORTABLE

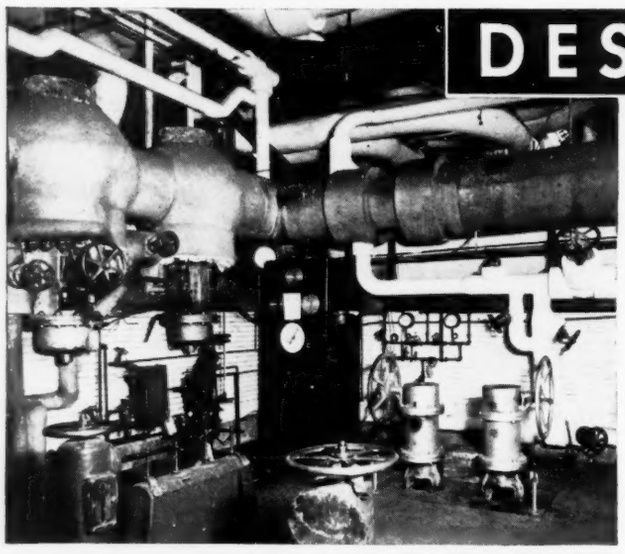
Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Snap-on Tools Corp, Kenosha, Wis.
Buckeye Portable Tool Co, Dayton, Ohio
Clark, James Jr, Electric Co, Louisville, Ky.
Independent Pneumatic Tool Co, 600 W Jackson Blvd, Chicago, Ill.
Mall Tool Co, S Chicago Ave, Chicago, Ill.
Millers Falls Co, 59 Wells St, Greenfield, Mass.
Schauer Machine Co, Cincinnati, Ohio
Standard Electrical Tool Co, 1918 W 8th, Cincinnati, Ohio
Syntron Co, 492 Lexington Ave, Homer City, Pa.

DUST COLLECTORS

(See Collectors, Dust)

ECONOMIZERS

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.



DESUPERHEATERS

For Your Special Requirements

Whatever your plant conditions, you can obtain the necessary operating flexibility and accurate regulation of steam temperature with the rugged, simply-controlled Republic-Smoot desuperheaters described below.

RATIO TYPE

This desuperheater is a self-supported venturi in which the desuperheating water, completely evaporated at all flows, is controlled by the steam flow in the correct proportion to reduce the steam temperature to the required value.

RATIO TANK TYPE

This unit is similar to the ratio type except that a water tank is added to give emergency water reserve.

STEAM ATOMIZING TYPE

In this desuperheater, built for extremely wide range operation and zero pressure loss, the desuperheating water is completely atomized at all rates of flow by a small quantity of high-pressure steam.

MECHANICAL TYPE

This unit is designed for special applications such as the control of turbine exhaust temperature or for use where atomizing steam is not available.

A Republic-Smoot engineer will gladly consult with you on your specific desuperheating problem. Write today, without obligation, for further details.

TYPICAL INSTALLATIONS

APPALACHIAN ELECTRIC POWER CO.
BOSTON EDISON CO.
BROOKLYN EDISON CO.
CINCINNATI GAS AND ELECTRIC CO.
E. I. DU PONT DE NEMOURS & CO.
NORTHERN PAPER MILLS
POTOMAC EDISON CO.
JACOB RUPPERT BREWERY
STANDARD OIL CO. OF N. J.
UNION BAG & PAPER CO.
THE TEXAS CO.
UNITED ILLUMINATING CO.

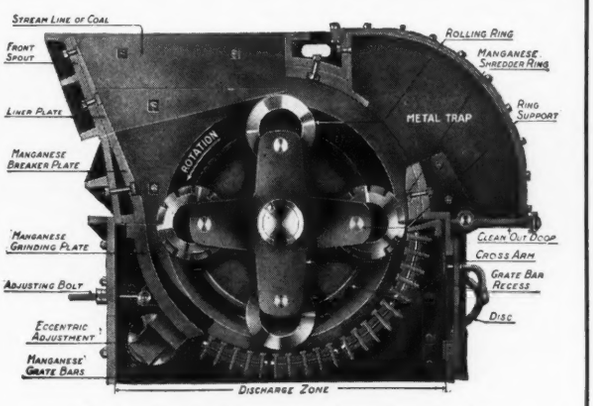
REPUBLIC FLOW METERS CO. 2222 DIVERSEY PKWY. CHICAGO, ILLINOIS

Better coal sizing for more efficient combustion

AMERICAN RING CRUSHERS

CAPACITIES

25 TO 500 TONS PER HOUR



Cross-sectional view of American Ring Crusher

American Ring Crushers reduce in one operation run-of-mine or lump coal to the proper sizes required for unit pulverizers and automatic stokers.

PRINCIPLE OF OPERATION

In design and construction the "AMERICAN" differs from any other type ring crusher. Feed enters at the top and is rolled by the rings in a downward movement against the breaker plate where primary reduction takes place. Final reduction is performed against an adjustable grinding plate where any oversize is eliminated in the sizing chamber by grate bars or screen plates.

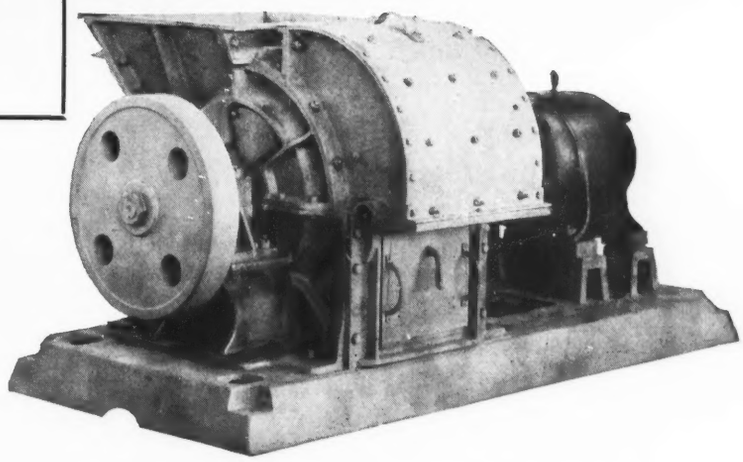
The rotor in the "American" consists of a heavy alloy steel main shaft to which are keyed steel discs and spiders or cross arms. The shafts supporting the rings are of high carbon steel and the rings are installed in a staggered arrangement covering the entire grinding surface of the machine. The patented shredder rings split the coal rather than crush it.

SPECIALLY DESIGNED
for individual requirements

American Crushers are built special for each installation. Speed of rotor is determined by the characteristics of the feed and the sizing desired for the specific installation.

ENGINEERING SERVICE
guarantees performance

The many successful installations of "AMERICAN" RING CRUSHERS in industrial power plants, central stations and institutions of all kinds are the result of the thoroughness with which our engineers survey each individual requirement before making a recommendation. On the basis of our recommendations, "AMERICAN" Ring Crushers are installed and guaranteed for definite performance. You can depend on an "AMERICAN" analysis of your problem. Ask us for assistance in meeting your needs.



Type "S" Improved American Ring Crusher—unbreakable from any crushing strain—anti-friction bearings—patented adjustable grinding plate—tramp metal passed without injury.

Rings in the "AMERICAN" Ring Crusher —weighing 27 lbs. each—are of manganese steel. These rings apply centrifugal force to strike, roll and grind.

The patented scraper and shredder rings of the "AMERICAN"—an exclusive feature—splits the coal and prevents clogging. The action of the rings in the "AMERICAN" is largely responsible for the low cost per ton of finished product. Coal can be crushed to stoker size at a total cost of less than 1c per ton for all charges.

AMERICAN PULVERIZER COMPANY
1349 Macklind Avenue
St. Louis, Missouri
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Keeler, E, Co, Williamsport, Pa.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Springfield Boiler Co, Springfield, Ill.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Green Fuel Economizer Co, 637 Main St, Beacon, N. Y.
Heilman Boiler Works, Allentown, Pa.
Richmond Engrg Co, 7th & Hospital Sts, Richmond, Va.
Wickes Boiler Co, 512 N Water St, Saginaw, Mich.

EJECTORS

Chaplin-Fulton Mfg Co, 28 Penn Ave, Pittsburgh, Pa.
Condenser Service & Engrg Co, 310 12th St, Hoboken, N. J.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Jarecki Mfg Co, Erie, Pa.
Quimby Pump Co, Inc, 347 Thomas St, Newark, N. J.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Duriron Co, Inc, Dayton, Ohio
Fischer & Porter Co, 61 W Penn St, Germantown, Phila, Pa.
Hancock Valve Div, Manning, Maxwell & Moore, 143 Elias St, Bridgeport, Conn.
Lummus Co, 420 Lexington Ave, New York, N. Y.
Nathan Mfg Co, 250 Park Ave, New York, N. Y.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.

ELECTRICALLY OPERATED VALVES

(See Valves, Electrically Operated)

ELECTRODES, ARC OR GAS WELDING

(See Rods, Welding)

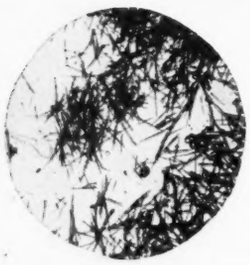
ELEVATORS, PASSENGER, FREIGHT

American Elevator & Machine Co, Inc, Louisville, Ky.
Atlantic Elevator Co, Erie Ave & D St, Philadelphia, Pa.
Bay State Elevator Co, Springfield, Mass.
Chelsea Elevator Co, 101 Park Ave, New York, N. Y.
Energy Elevator Co, 219 New St, Philadelphia, Pa.
General Electric Co, Schenectady, N. Y.
Gurney Elevator Co, Inc, 109 W 64th St, New York, N. Y.
Haughton Elevator Co, Toledo, Ohio
Kieckhefer, A, Elevator Co, Milwaukee, Wis.
Otis Elevator Co, 260 11th Ave, New York, N. Y.
Reedy Elevator Mfg Co, 7 W 2nd St, Cincinnati, Ohio
Rosenberg, F, Elevator Co, Milwaukee, Wis.
Schatzman Elevator Corp, Reading, Pa.
Warner Elevator Mfg Co, 2603 Spring Grove Ave, Cincinnati, O.
Warsaw Elevator Mfg Co, Inc, Danville, Va.
Westinghouse Elect Elevator Co, 150 Broadway, New York, N. Y.

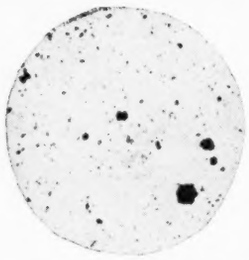
ENGINES, GAS

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Sterling Engine Co, 1252 Niagara St, Buffalo, N. Y.
Superior Engine Div, National Supply Co, Springfield, Ohio
Worthington Pump and Machinery Corp, Harrison, N. J.

STABILIZED WATER
for Diesel Engines, Heaters, etc.



BEFORE—This highly magnified view shows calcium carbonate crystals formed by heating water that has not been stabilized.



AFTER—Here is how the same water looks after being stabilized by Nalco treatment. It has been subjected to the same heat.

WATER that will remain stable *(non-scale forming)*, even at high feedwater temperatures is yours if you use Nalco Stabilizing Treatment in diesel engines, water heaters, etc. Write for information. NATIONAL ALUMINATE CORP., 6222 W. 66th Place, Chicago, Ill.

THE Nalco SYSTEM OF WATER TREATMENT

Atlas Imperial Diesel Engine Co, 1000 19th Ave, Oakland, Cal.
Bruce-Macbeth Engine Co, Cleveland, Ohio
Caterpillar Tractor Co, 1940 Walker Ave, Peoria, Ill.
Clark Bros Co, Olean, N. Y.
Climax Engrg Co, Clinton, Iowa
Cooper-Bessemer Corp, Mt Vernon, Ohio
Enterprise Engine Co, 2902 19th St, San Francisco, Calif.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Le Roi Co, Milwaukee, Wis.
National Transit Pump & Machine Co, Oil City, Pa.
Novo Engine Co, 1 Porter St, Lansing, Mich.
Rathbun-Jones Engrg Co, Toledo, Ohio
Reid, Joseph, Gas Engine Co, Box 177, Oil City, Pa.
Titusville Iron Works Co, Titusville, Pa.
Waukesha Motor Co, Waukesha, Wis.
Western Engine Co, 2740 E 37th St, Los Angeles, Calif.
Witte Engine Works, 1600 Oakland Bldg, Kansas City, Mo.

ENGINES, GASOLINE

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Sterling Engine Co, 1252 Niagara St, Buffalo, N. Y.
Buda Co, Harvey, Ill.
Buffalo Gasoline Motor Co, Buffalo, N. Y.
Caterpillar Tractor Co, 1940 Walker Ave, Peoria, Ill.
Climax Engrg Co, Clinton, Iowa
Hercules Motor Corp, Canton, O.
Le Roi Co, Milwaukee, Wis.
Lycoming Mfg Co, Williamsport, Pa.
Novo Engine Co, 1 Porter St, Lansing, Mich.
Stover Mfg & Engine Co, Ellis St, Freeport, Ill.
Waukesha Motor Co, Waukesha, Ill.
Witte Engine Works, 1600 Oakland Bldg, Kansas City, Mo.

ENGINES, OIL

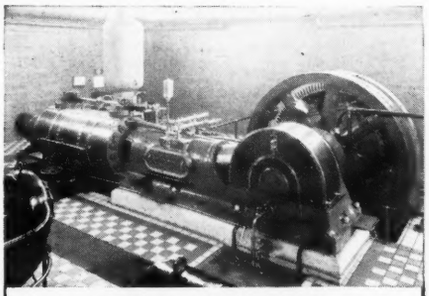
Allis-Chalmers Mfg Co, Milwaukee, Wis.
American Locomotive Co, 36 Church St, New York, N. Y.
Buckeye Machine Co, Lima, Ohio
Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Nordberg Mfg Co, 3073 S Chase Ave, Milwaukee, Wis.
Sterling Engine Co, 1252 Niagara St, Buffalo, N. Y.
Superior Engine Div, National Supply Co, Springfield, Ohio
Worthington Pump & Machinery Corp, Harrison, N. J.
Anderson Diesel Engine Co, 6245 State Rd, Tacony, Pa.
Atlas Imperial Diesel Engine Co, 1000 19th Ave, Oakland, Cal.
Ball-Muncie Engine Co, Muncie, Ind.
Bauer, Frank, & Co, 51 N Dean St, Englewood, N. J.
Bolinders Co, Inc, 33 Rector St, New York, N. Y.
Buda Co, Harvey, Ill.
Busch-Sulzer Bros Diesel Engine Co, 2nd & Utah, St Louis, Mo.
Caterpillar Tractor Co, 1940 Walker Ave, Peoria, Ill.
Clark Bros Co, Olean, N. Y.
Cooper-Bessemer Corp, Mt Vernon, Ohio
Cummins Engine Co, Columbus, Ind.
De La Vergne Engine Co, Paschall P O, Philadelphia, Pa.
Electric Boat Co, Groton, Conn.
Enterprise Engine Co, 2902 19th St, San Francisco, Calif.
F A B Mfg Co, Oakland, Calif.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Fulton Iron Works, 6400 Gambleton Pl, St Louis, Mo.
General Motors Sales Corp, Cleveland, Ohio
Hercules Motors Corp, Canton.
Hill Diesel Engine Co, Lansing, Mich.
Hooven, Owens, Rentschler Div, Genl Mach Corp, Hamilton, O.
International Harvester Co, 180 N Michigan Ave, Chicago, Ill.
Johnson Mfg Co, Fox & Holly Sts, Seattle, Wash.
Kahlenberg Bros Co, Two Rivers, Wis.
Markey Machinery Co, Inc, 85 Horton St, Seattle, Wash.
Murphy Diesel Co, 5331 W Burnham St, Milwaukee, Wis.
Northill Co, Inc, 6824 McKinley Rd, Los Angeles, Calif.
Peet & Powers, Inc, 70 E 45th St, New York, N. Y.
Power Mfg Co, Marion, Ohio
Rathbun-Jones Engrg Co, Toledo, Ohio
Reid, Joseph, Gas Engine Co, Box 177, Oil City, Pa.
Standard Diesel Engine Co, 150 Whiton St, Jersey City, N. J.
Stover Mfg & Engine Co, Ellis St, Freeport, Ill.
Titusville Iron Works Co, Titusville, Pa.
Union Diesel Engine Co, Kennedy & E 7th Sts, Oakland, Calif.
Venn-Severin Machine Co, 1317 W North Ave, Chicago, Ill.
Washington Iron Works, 6th Ave South, Seattle, Wash.
Waukesha Motor Co, Waukesha, Wis.
Weber Engine Co, 12th & Winchester Sts, Kansas City, Mo.
Western Engine Corp, 2740 E 37th St, Los Angeles, Calif.
Witte Engine Works, 1600 Oakland Bldg, Kansas City, Mo.
Wolverine Motor Works, Inc, Bridgeport, Conn.

ENGINES, STEAM

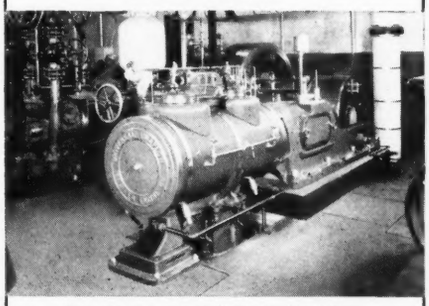
Elliott Co, Jeanette, Pa.
Murray Iron Works Co, Burlington, Iowa
Nordberg Mfg Co, 3073 S Chase Ave, Milwaukee, Wis.
Skinner Engine Co, Dept U, Erie, Pa.
Troy Engine & Machine Co, 142 Railroad Ave, Troy, Pa.
Ames Iron Works, Oswego, N. Y.
Dake Engine Co, 633 Monroe St, Grand Haven, Mich.
Erie City Iron Works, 1422 East Ave, Erie, Pa.
Filer & Stowell Co, 147 E Becher St, Milwaukee, Wis.
Fitchburg Engrg Corp, Fitchburg, Mass.
Hardie-Tynes Mfg Co, Birmingham, Ala.
Harrisburg Foundry & Machine Co, Harrisburg, Pa.
Morris Machine Works, Baldwinsville, N. Y.
Nagle Engine & Boiler Works, Erie, Pa.
Providence Engrg Works, Providence, R. I.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
Wachs, E H, Co, Dayton St, Chicago, Ill.
Wilson Snyder Mfg Corp, Pittsburg, Pa.

EVAPORATORS

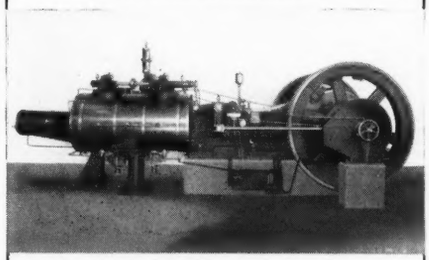
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Westinghouse Electric & Mfg Co, East Pittsburgh, Pa.
Alco Products Div, 36 Church St, New York, N. Y.
Bethlehem Steel Co, Bethlehem, Pa.
Blaw-Knox Co, Pittsburgh, Pa.
Croll-Reynolds Engrg Co, 17 John St, New York, N. Y.
Davis Engrg Corp, 1064-16 E Grand Ave, Elizabeth, N. J.
Devine, J P, Mfg Co, Inc, Mt Vernon, Ill.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
International Filter Co, 325 W 25th Place, Chicago, Ill.
Manistee Iron Works, Manistee, Mich.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Squier, Geo L, Mfg Co, Buffalo, N. Y.
Stearns-Roger Mfg Co, Denver, Colo.
Stokes, F J, Machine Co, Philadelphia, Pa.
Struthers-Wells Titusville Corp, Titusville, Pa.
Swenson Evaporator Co, Harvey, Ill.
U S Pipe & Foundry Co, Burlington, N. Y.
Zaremba Co, Buffalo, N. Y.



SIDE CRANK "UNIVERSAL UNAFLOW" DIRECT CONNECTED

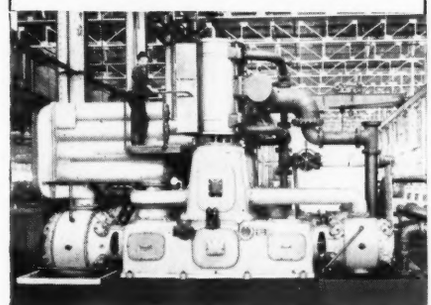


"UNIVERSAL UNAFLOW" DIRECT CONNECTED TO AMMONIA COMPRESSOR

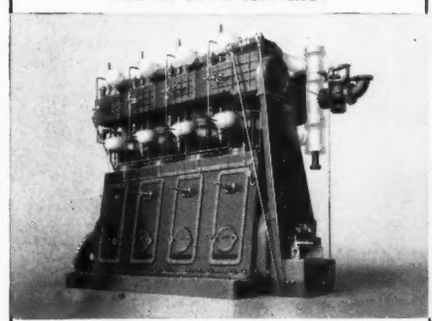


CENTER CRANK VARIABLE-SPEED MANUALLY CONTROLLED "UNIVERSAL UNAFLOW" FOR COMPRESSOR DRIVE

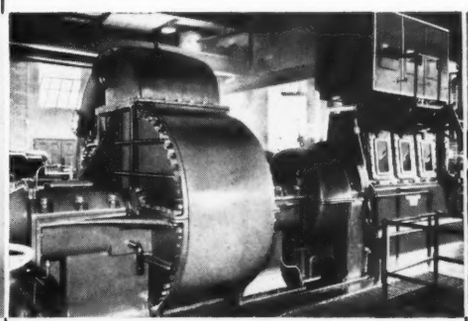
AUTOMATIC VARIABLE-SPEED "UNIVERSAL UNAFLOW" FOR COMPRESSOR OR HOT OIL PUMP DRIVE



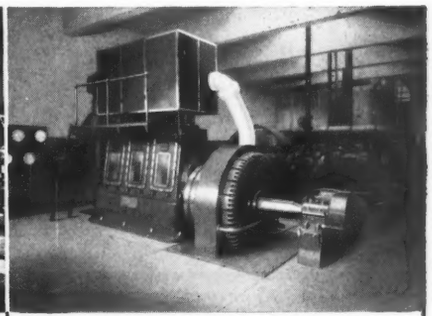
TWIN VERTICAL UNAFLOW CYLINDERS MOUNTED ON AIR COMPRESSOR



SKINNER MARINE UNAFLOW STEAM ENGINE



AUTOMATIC VARIABLE-SPEED VERTICAL "UNIVERSAL UNAFLOW" FOR BLOWER DRIVE



DIRECT CONNECTED STATIONARY VERTICAL "UNIVERSAL UNAFLOW"

For Generating Power—
For Driving Compressors,
Pumps, Blowers, etc.

SKINNER

HORIZONTAL OR VERTICAL

"UNIVERSAL UNAFLOW" STEAM ENGINES

The most complete line of poppet-valve unaflow steam engines in this country, and probably in the world, has been designed and built by this company. Eighteen different types of horizontal and vertical unaflow engines are available for stationary or marine service. Selection of the proper type of "the most economical steam engine ever built" may be made for your particular requirements.

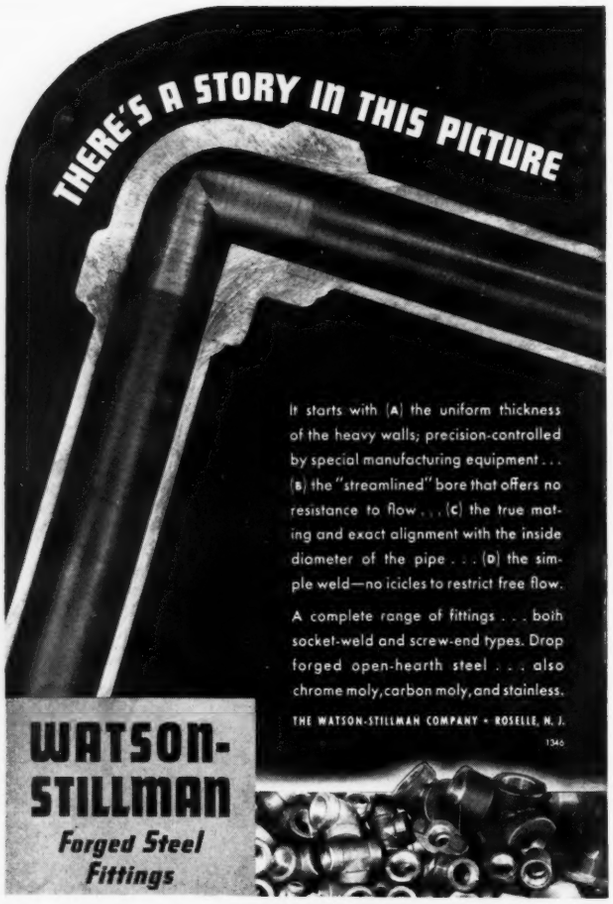
Maintained high economy of every SKINNER UNAFLOW ENGINE is assured by the use of permanently steam-tight poppet valves. Hundreds of installations have been paid for out of savings in fuel or in comparison with purchased power.

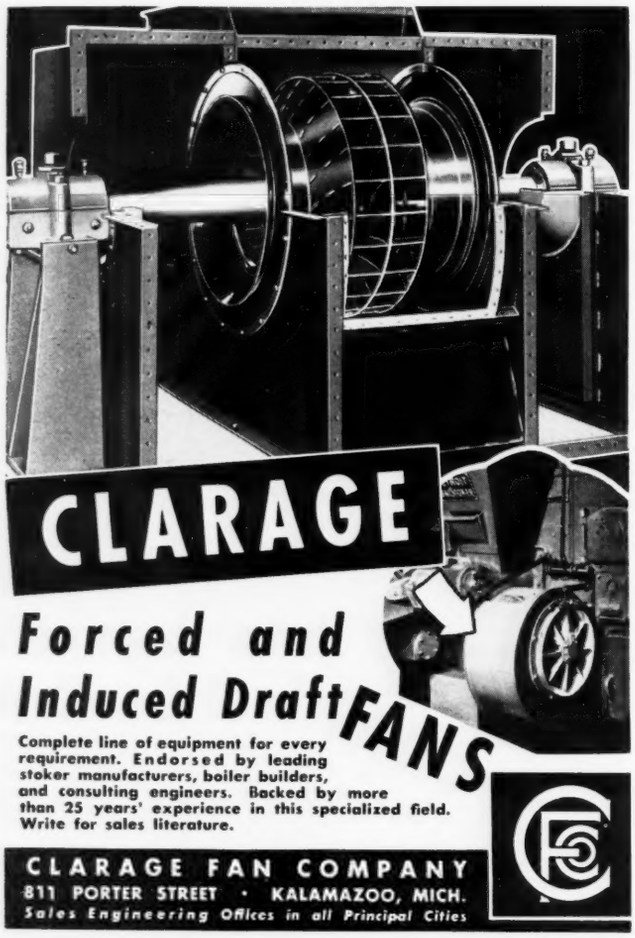
For generator drive, SKINNER "UNIVERSAL UNAFLOW" ENGINES are built in horizontal and multi-cylinder vertical types; horizontal type, for generators of 50 to 800-kw. capacity; vertical, 150 to 1500-kw.

For compressors, pumps, blowers, etc., both constant-speed and variable-speed types are available. Patented sleeve-poppet-valve gear, for manual or automatic variable-speed control, maintains desired capacities or compressor pressures.

Literature and complete information on "UNIVERSAL UNAFLOW" ENGINES for your particular application will be forwarded on request.

SKINNER ENGINE CO., ERIE, PA.


THERE'S A STORY IN THIS PICTURE
It starts with (A) the uniform thickness of the heavy walls; precision-controlled by special manufacturing equipment . . . (B) the "streamlined" bore that offers no resistance to flow . . . (C) the true mating and exact alignment with the inside diameter of the pipe . . . (D) the simple weld—no icicles to restrict free flow.
A complete range of fittings . . . both socket-weld and screw-end types. Drop forged open-hearth steel . . . also chrome moly, carbon moly, and stainless.
THE WATSON-STILLMAN COMPANY • ROSELLE, N. J.
1346
WATSON-STILLMAN
Forged Steel Fittings


CLARAGE
Forced and Induced Draft FANS
Complete line of equipment for every requirement. Endorsed by leading stoker manufacturers, boiler builders, and consulting engineers. Backed by more than 25 years' experience in this specialized field. Write for sales literature.
CLARAGE FAN COMPANY
811 PORTER STREET • KALAMAZOO, MICH.
Sales Engineering Offices in all Principal Cities

EXPANDERS, BOILER-TUBE

Dudgeon, Richard, Inc, 24 Columbia St, New York, N. Y.
Faessler, J Mfg Co, Moberly, Mo.
Helwig Mfg Co, St Paul, Minn.
Key Co, Alta Sita, East St Louis, Ill.
Leach, C H, Co, 117 Liberty St, New York, N. Y.

EXPANSION JOINTS

(See Joints, Expansion)

EXTINGUISHING EQUIPMENT, FIRE

Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Grinnell Co, 277 W Exchange St, Providence, R. I.
Kidde, Walter & Co, 6 West St, Bloomfield, N. J.
American - LaFrance - Foamite Corp, Elmira, N. Y.
Badger Fire Extinguisher Co, Boston, Mass.
Cardox Corp, 307 N Michigan Ave, Chicago, Ill.
C-O-Two Fire Equipment Co, 10 Empire St, Newark, N. J.
Elkhart Brass Mfg Co, Elkhart, Ind.
Pyrene Mfg Co, 560 Belmont Ave, Newark, N. J.
Rockwood Sprinkler Co, 54 Harlow St, Worcester, Mass.
Sellers, Wm, & Co, 1600 Hamilton St, Philadelphia, Pa.
Smith-Meeker Engrg Co, 125 Barclay St, New York, N. Y.

FANS

(See Also Blowers)
American Blower Corp, 6000 Russell St, Detroit, Mich.
Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Clarage Fan Co, 621 Porter St, Kalamazoo, Mich.
Coppus Engrg Corp, 350 Park Ave, Worcester, Mass.
De Laval Steam Turbine Co, Trenton, N. J.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kan.
Moore Steam Turbine Corp, 37 Coats St, Wellsville, N. Y.
Prat-Daniel Corp, 80 S Water St, Port Chester, N. Y.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Airtherm Mfg Co, 1497 S Vandeventer Ave, St. Louis, Mo.
Allen, E H, Co, Dept P, 22 Dorrance St, Boston, Mass.
Barnard & Leas Mfg Co, Moline, Ill.
Bayley Blower Co, 1817 S 66th St, Milwaukee, Wis.
Carling Turbine Blower Co, 25 St John's Rd, Worcester, Mass.
Champion Blower & Forge Co, Lancaster, Pa.
Diehl Mfg Co, Elizabethport, N. J.
Garden City Fan Co, 8 Michigan Ave, Chicago, Ill.
Grand Rapids Blow Pipe & Dust Arrester Co, Grand Rapids, Mich.
Green Fuel Economizer Co, 637 Main St, Beacon, N. Y.
Hartzell Propeller Fan Co, Piqua, Ohio.
Hunter, James, Machine Co, N Adams, Mass.
International Engrg Inc, Dayton, Ohio.
Jeffrey Mfg Co, 932-99 N Fourth St, Columbus, Ohio.
Johnson Fan & Blower Co, Dept P, 1319 W Lake, Chicago, Ill.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, Ohio
Kisco Co, Inc, 3736 Chouteau Ave, St. Louis, Mo.
Lehigh Fan & Blower Co, Allentown, Pa.
Robbins & Myers, Inc, Springfield, Ohio.
Skinner Heating & Ventilating Co, 1990 N 9th, St Louis, Mo.
Sly, W W, Mfg Co, Cleveland, O.
Sterling Blower Co, Hartford, Conn.
Wing, L J, Mfg Co, W 14th St & 7th Ave, New York, N. Y.

FEEDER CONVEYORS

(See Conveyors, Feeder)

FEEDERS, CHEMICAL

Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Condenser Service & Engrg Co, 310 12th St, Hoboken, N. J.
Elgin Softener Corp, 55 North St, Elgin, Ill.
National Aluminate Corp, 6222 W 66th Place, Chicago, Ill.
Permutit Co, Dept A, 330 W 42nd St, New York, N. Y.
Scaife, Wm B, & Sons Co, River & Ann St, Oakmont, Pa.
Bacharach, E W, & Co, Kansas City, Mo.
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Haering, D W, & Co, 2306 S Winchester, Chicago, Ill.
Hungerford & Terry, Inc, Clayton, N. J.
International Filter Co, 325 W 25th Place, Chicago, Ill.
Leopold, F B, Co, Pittsburgh, Pa.
Manzel Bros Co, 326 Babcock St, Buffalo, N. Y.
Power Plant Specialty Co, 1390-440 Dearborn, Chicago, Ill.
Proportioneers, Inc, 7 Codding St, Providence, R. I.
Roy, Milton, Pump Co, 2031 E Madison St, Philadelphia, Pa.
Savage, W J, Co, Knoxville, Tenn.

FEEDERS, COAL

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Syntron Co, 492 Lexington Ave, Homer City, Pa.

FELT, HAIR

Johns-Manville, 22 E 40th St, New York, N. Y.
Ehret Magnesia Mfg Co, Inc, Valley Forge, Pa.
Standard Asbestos Mfg Co, 820 W Lake St, Chicago, Ill.
Western Felt Works, Ogden Ave, Chicago, Ill.

FELT PACKINGS

(See Packing, Felt)

FERRULES, CONDENSER-TUBE

Chase Brass & Copper Co, Inc, Waterbury, Conn.
Scovill Mfg Co, 99 Mill St, Waterbury, Conn.
Torrington Mfg Co, Torrington, Conn.

FIBRE PACKING

(See Packing, Fibre)

FIBRE, VULCANIZED

General Electric Co, Schenectady, N. Y.
Continental Diamond Fibre Co, Dept 18, Newark, Del.
National Vulcanized Fibre Co, Wilmington, Del.
Wilmington Fibre Specialty Co, Wilmington, Del.

FILTERS, AIR

Air-Maze Corp, 5120 Harvard Ave, Cleveland, Ohio
Burgess Battery Co, 500 W Huron St, Chicago, Ill.
Coppus Engrg Corp, 350 Park Ave, Worcester, Mass.
Staynew Filter Corp, Rochester, N. Y.
American Air Filter Co, Louisville, Ky.
Cuno Engrg Corp, Meriden, Conn.
Dracco Corp, 4083 E 116th St, Cleveland, Ohio.
Federal Pneumatic Systems N Dearborn St, Chicago, Ill.

Holly Pneumatic Systems, Inc, Dept 15, 15 E 40th St, New York, N. Y.
Hugo Mfg Co, West Duluth, Minn.
Independent Air Filter Co, N La Salle St, Chicago, Ill.
Logansport Machine, Inc, 914 Cotner Rd, Logansport, Ind.
Michiana Products Corp, Michigan City, Ind.
Norgren, C A, Co, 210 Santa Fe Drive, Denver, Colo.
Owens-Illinois Glass Co, Toledo, Ohio.
Simons Paint Spray Brush Co, 9 Maryland Ave, Dayton, Ohio.
Skinner Purifiers, Inc, 2231 Dalzelle St, Detroit, Mich.
Sly, W W, Mfg Co, Cleveland, Ohio.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Vortox Mfg Co, Claremont, Calif.

FILTERS, OIL

Elliott Co, Jeannette, Pa.
Hilliard Corp, 4 W 4th St, Elmira, N. Y.
American Bosch Corp, 3670 Main St, Springfield, Mass.
Bousman Mfg Co, Inc, Grand Rapids, Mich.
Bowser, S F, & Co, 1302 E Creighton Ave, Ft Wayne, Ind.
Buckeye Laboratories, Inc, Box 748, Alliance, Ohio.
Burt Mfg Co, 232 Main St, Akron, Ohio.
Cuno Engrg Corp, Meriden, Conn.
De Luxe Products Corp, La Porte, Ind.
Dushane Co, 1516 S Wabash Ave, Chicago, Ill.
Goulds Pumps, Inc, 301 Fall St, Seneca Falls, N. Y.
Honan-Crane Corp, Lebanon, Ind.
Nugent, Wm W, & Co, Inc, 402 N Hermitage Ave, Chicago, Ill.
Plouff Co, Columbus Ave, Boston, Mass.
Skinner Purifiers Inc, 2231 Dalzelle St, Detroit, Mich.

FILTERS, WATER

Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Elgin Softener Corp, 55 North St, Elgin, Ill.
Elliott Co, Jeannette, Pa.
Permutit Co, Dept A, 330 W 42nd St, New York, N. Y.
Scaife, Wm B, & Sons, Co, River & Ann St, Oakmont, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
American Water Softener Co, Philadelphia, Pa.
Bacharach, E W, & Co, Kansas City, Mo.
Bird Machine Co, South Walpole, Mass.
Cuno Engrg Corp, Meriden, Conn.
Hygeia Filter Co, Detroit, Mich.
International Filter Co, 325 W 25th Place, Chicago, Ill.
Loomis-Manning Filter Mfg Co, Philadelphia, Pa.
McKays Co, St Paul, Minn.
Norwood Engrg Co, Florence, Mass.
Plouff Co, Columbus Ave, Boston, Mass.
Power Plant Specialty Co, 1390-440 S Dearborn, Chicago, Ill.
Stover Steel Tank & Mfg Co, Freeport, Ill.

FIRE-PROTECTION & EXTINGUISHING EQUIPMENT

(See Extinguishers, Fire)

Look for the noun in the product listing, for example:

"Filters, Oil"

not

"Oil Filters"

FIREBRICK

(See Brick, Fire, Refractories)

FIRST-AID SUPPLIES

Mine Safety Appliances Co, Pittsburgh, Pa.

FITTINGS, PIPE, REFRIGERATION

Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Worthington Pump & Machinery Corp, Harrison, N. J.
Walworth Co, 60 E 42nd St, New York, N. Y.
Watson-Stillman Co, Roselle, N. J.
Baker Ice Machine Co, Inc, Omaha, Neb.
Parker Appliance Co, Cleveland, Ohio.
Phoenix Machine Co, Cleveland, Ohio.
Vesterdahl, Karl, & Co, 90 West St, New York, N. Y.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

FITTINGS, PIPE

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Grinnell Co, Inc, 377 W Exchange St, Providence, R. I.
Harrisburg Steel Corp, Harrisburg, Pa.
Jarecki Mfg Co, Erie, Pa.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, O.
Midwest Piping & Supply Co, 1450 S 2nd St, St Louis, Mo.
National Valve & Mfg Co, 3102 Liberty Ave, Pittsburgh, Pa.
Pittsburgh Piping & Equip Co, 12 43rd St, Pittsburgh, Pa.
Reading-Pratt & Cady Div, 929 Connecticut Ave, Bridgeport, Conn.
Taylor Forge & Pipe Works, Box 485, Chicago, Ill.
Tube-Turns, Inc, 224 E Broadway, Louisville, Ky.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Walworth Co, 60 E 42nd St, New York, N. Y.
Watson-Stillman Co, Roselle, N. J.
Bonney Forge & Tool Works, 78 N Meadow, Allentown, Pa.
Clow, James B, & Sons, 201 N Talman Ave, Chicago, Ill.
Glover Machine Works, Marietta, Ga.
Jefferson Union Co, 601 W 26th St, New York, N. Y.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
M & H Valve & Fittings Co, Anniston, Ala.
Pittsburgh Valve & Fittings Corp, Barberton, Ohio.
Stockham Pipe Fittings Co, Birmingham, Ala.
Victaulic Co of America, 30 Rockefeller Plaza, New York, N. Y.

FITTINGS, TUBE, COMPRESSION OR SOLDER

American Brass Co, Waterbury, Conn.
Chase Brass & Copper Co, Waterbury, Conn.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Lunkenheimer Co, Box 360, Cincinnati, Ohio.
Walworth Co, Inc, 60 E 42nd St, New York, N. Y.
Dole Valve Co, 1901–1941 Carroll Ave, Chicago, Ill.
Mueller Brass Co, 1925A Lapeer Ave, Port Huron, Mich.
Nugent, Wm W, & Co, Inc, 402 N Hermitage Ave, Chicago, Ill.
Parker Appliance Co, Cleveland, Ohio.

FLAX PACKING

(See Packing, Flax)

FLEXIBLE-METAL TUBING

(See Tubing, Metal)

FLOATS

Hercules Float Works, 200 Franklin St, Springfield, Mass.
Naugatuck Mfg Co, 460 N Main St, Naugatuck, Conn.
Nicholson, W H, & Co, 125 Oregon St, Wilkes-Barre, Pa.
Reliance Gauge Column Co, 5902 Carnegie Ave, Cleveland, Ohio

FLOAT VALVES

(See Valves, Float)

FLOOR PLATES

(See Plates, Floor)

FLYASH COLLECTORS

(See Collectors, Flyash)

FURNACE WALLS

(See Walls)

FUSES

Bussmann Mfg Co, University & Jefferson, St. Louis, Mo.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Trico Fuse Mfg Co, 2955 N 5th St, Milwaukee, Wis.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Bryant Electric Co, Bridgeport, Conn.
Colt's Patent Fire Arms Mfg Co, Hartford, Conn.
Delta-Star Electric Co, Fulton St, Chicago, Ill.
Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.
Jefferson Electric Co, Bellwood, Ill.
Railway & Industrial Engrg Co, Greensburg, Pa.
Schweitzer & Conrad, Inc, 4433 N Ravenswood, Chicago, Ill.
Southern States Equipment Co, Birmingham, Ala.

FUSIBLE PLUGS

(See Plugs)

GAGE BOARDS

(See Boards, Gage)

GAGE SNUBBERS

Meriam Co, W 112th St, Cleveland, Ohio
Ray Pressure Snubber Co, Charlotte, N. C.

GAGES, AMMONIA

U. S. Gauge Co, 44 Beaver St, New York, N. Y.
Ashton Valve Co, 165 1st St, Cambridge, Mass.
Bristol Co, Waterbury, Conn.
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
Lonergan, J E Co, Race St, Philadelphia, Pa.
Manning, Maxwell & Moore, Inc, Bridgeport, Conn.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.

GAGES, DRAFT

Bailey Meter Co, 1036 Ivanhoe Road, Cleveland, Ohio.
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Hays Corp, 905 8th St, Michigan City, Ind.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Bacharach Industrial Inst. Co, 7000 Bennett St, Pittsburgh, Pa.
Bristol Co, Waterbury, Conn.
Dwyer, F W, Mfg Co, 561 W Washington St, Chicago, Ill.
Ellison Draft Gage Co, 214 W Kinzie St, Chicago, Ill.
Friez, Julien P, & Sons, 4 N Central Ave, Baltimore, Md.
Manning, Maxwell & Moore, Inc, Bridgeport, Conn.
Meriam Co, W 112th St, Cleveland, Ohio
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.
Uehling Instrument Co, 470 Getty Ave, Paterson, N. J.

GAGES, LIQUID-LEVEL

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Diamond Power Specialty Corp, Box 288, Detroit, Mich.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, Ohio
McNeill, T W, Engrg Equipt Co, 4059 W Van Buren, Chicago, Ill.
Powell, Wm, Co, Cincinnati, O.
Reliance Gauge Column Co, 5902 Carnegie Ave, Cleveland, Ohio
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Taylor Instrument Cos, Rochester, N. Y.
Bristol Co, Waterbury, Conn.
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
Ernst Water Column & Gage Co, Livingston, N. J.
Esterline-Angus Co, Box 596, Indianapolis, Ind.
Friez, Julien P & Sons, 4 N Central Ave, Baltimore, Md.
Klingerit, Inc, 16 Hudson St, New York, N. Y.
Liquidometer Corp, 3616 Skillman Ave, Long Island City, N. Y.
Lonergan, J E, Co, Race St, Philadelphia, Pa.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Shand & Jurs Co, Carlton St, Berkeley, Calif.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.

GAGES, PRESSURE

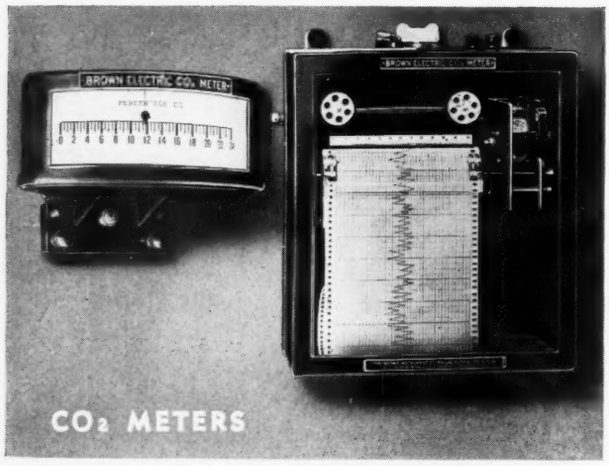
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.

UNITED STATES GAUGE COMPANY

INDICATING and RECORDING PRESSURE GAUGES

All Sizes and Types for Every Purpose

44 BEAVER STREET NEW YORK



For Recording and Indicating the Per Cent CO_2 in Flue Gas

Analyzes the flue gases electrically and then transmits the readings electrically to an indicating or recording meter, or both. No moving parts or chemicals in the gas analysis cell.

Furnished in three types for recording from one to six readings on a single chart, 7" wide. Single point recorders record the per cent CO_2 on a full width chart, using an inked ribbon. Multiple models record from two to three CO_2 readings on a full width chart using a multi-colored ribbon. Multiple duplex models record from two to six readings on two sections of a full-width chart, using two measuring systems and one multi-colored inked ribbon. Flue gas temperature can be recorded on same duplex chart with CO_2 reading. One, two or three temperatures and CO_2 readings can be recorded on the same duplex chart. Indicating reading is obtained directly on a 6" scale.

Write for Catalog 3006. THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4490 Wayne Avenue, Philadelphia, Pa.

BROWN ELECTRIC CO_2 METER

To Measure and Control is to Economize

GOETZE *for* GASKETS

● All types, shapes, sizes, materials—for every power plant need. Superior workmanship. Dependable service.

GOETZE GASKET AND PACKING CO., INC.
10 ALLEN AVENUE NEW BRUNSWICK, N. J.

CO_2 RECORDERS

MICROMAX INSTRUMENTS INDICATE AND RECORD CO_2 IN FLUE GAS

A valuable guide to efficient boiler operation, Micromax CO_2 recording equipment is simple and reliable. It consists of but two principal elements: gas analysis panel in heavy metal case; and Micromax Recorder—either strip-chart or round-chart model. Operating entirely on a-c, it measures a continuous sample of saturated gas by the thermal-conductivity method—thoroughly reliable because of its accuracy, fast response, ease of operation and small maintenance.

Write for catalog.

LEEDS & NORTHRUP COMPANY
4987 Stenton Avenue, Philadelphia, Pa.
LEEDS & NORTHRUP

Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Taylor Instrument Cos, Rochester, N. Y.
U. S. Gauge Co, 44 Beaver St, New York, N. Y.
American Meter Co, Inc, 60 E 42nd St, New York, N. Y.
Ashton Valve Co, 165 1st St, Cambridge, Mass.
Bacharach Industrial Inst Co, 7000 Bennett, Pittsburgh, Pa.
Bristol Co, Waterbury, Conn.
Clark, Chas J, Blast Meter Co, Gladbrook, Iowa
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
Esterline-Angus Co, Box 596, Indianapolis, Ind.
Logansport Machine, Inc, 914 Cotner Rd, Logansport, Ind.
Lonergan, J E, Co, Race St, Philadelphia, Pa.
Manning, Maxwell & Moore, Inc, Bridgeport, Conn.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Meriam Co, W 112th St, Cleveland, Ohio
Plouff Co, Columbus Ave, Boston, Mass.
Tagliabue, C J, Mfg Co, Park & Nostrand, Brooklyn, N. Y.
Uehling Instrument Co, 470 Getty Ave, Paterson, N. J.

GAS, ACETYLENE, OXYGEN

(See Welding)

GAS, AMMONIA

Bower, Henry, Chemical Co, Philadelphia, Pa.
duPont de Nemours, E I, Co, National Ammonia Div, Phila, Pa.
Mathieson Alkali Works, Inc, 60 E 42nd St, New York, N. Y.
Michigan Alkali Co, 60 E 42nd St, New York, N. Y.
Pennsylvania Salt Mfg Co, 1000 Widener Bldg, Philadelphia, Pa.

GAS, CARBON-DIOXIDE

Liquid Carbonic Co, Chicago, Ill.
Pure Carbonic Inc, 60 E 42nd St, New York, N. Y.

GAS, FREON

Kinetic Chemicals Inc, Wilmington, Del.

GAS, METHYL-CHLORIDE

Ansul Chemical Co, Marinette, Wis.
duPont de Nemours, E I, & Co, R & H Chemicals Div, Wilmington, Del.
Virginia Smelting Co, Boston, Mass.

GAS ANALYZERS

Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Hays Corp, 905 8th St, Michigan City, Ind.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Permutit Co, Dept A, 330 W 42nd St, New York, N. Y.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Bacharach Industrial Inst Co, 7000 Bennett, Philadelphia, Pa.
Defender Automatic Regulator Co, St Louis, Mo.
Dwyer, F W, Mfg Co, 561 W Washington St, Chicago, Ill.
Elmer & Amend, 3rd Ave & 18th St, New York, N. Y.
Ellison Draft Gage Co, 214 W Kinzie St, Chicago, Ill.
Engelhard, Charles, Inc, 234 NJRR Ave, Newark, N. J.
Tagliabue, C J, Mfg Co, Park & Nostrand, Brooklyn, N. Y.
Uehling Instrument Co, 470 Getty Ave, Paterson, N. J.

GAS BURNERS

(See Burners, Gas)

GASKETS

Belmont Packing & Rubber Co, East Butler & Sepviva Sts, Philadelphia, Pa.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Eureka Packing Co, 294–296 46th St, Brooklyn, N. Y.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packing Co, 10 Allen Ave, New Brunswick, N. J.
Johns-Manville, 22 E 40th St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
Smooth-On Mfg Co, D-30, 572 Communipaw Ave, Jersey City, N. J.
Akron Metallic Gasket Co, 160 N Union St, Akron, Ohio
American Felt Co, 315 4th Ave, New York, N. Y.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Armstrong Cork Co, Industrial Div, Lancaster, Pa.
Booth Felt Co, 455 19th St, Brooklyn, N. Y.
Chicago Wilcox Mfg Co, 7701 Avalon Ave, Chicago, Ill.
Cincinnati Gasket & Packing Co, Elm St, Cincinnati, Ohio
Continental Rubber Works, Erie, Pa.
Darcoid Co, Inc, 200 Varick St, New York, N. Y.
Detroit Gasket & Mfg Co, Detroit, Mich.
Durabla Mfg Co, Room 202, 114 Liberty St, New York, N. Y.
Ehret Magnesia Mfg Co, Inc, Valley Forge, Pa.
Endura Mfg Corp, Quakertown, Pa.
Ernst Water Column & Gage Co, Livingston, N. J.
Felters Co, Inc, Dept LM, 210 South St, Boston, Mass.
Flexitallic Gasket Co, Camden, N. J.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Houghton, E F, & Co, 244–250 W Somerset St, Phila, Pa.
Johnson, Henry, Co, Jersey City, N. J.
Klingerit, Inc, 16 Hudson St, New York, N. Y.
Linear Packing & Rubber Co, State Rd & Levick St, Phila, Pa.
Metallo Gasket Co, French St, New Brunswick, N. J.
National Lead Co, 111 Broadway, New York, N. Y.
National Vulcanized Fibre Co, Wilmington, Del.
Phoenix Specialty Mfg Co, 155 Wooster St, New York, N. Y.
Quaker City Rubber Co, Comly & Milnor Sts, Phila, Pa.
Robinson, John R, 354 W 31st St, New York, N. Y.
Savage Packing & Engrg Co, 1029 Clinton, Hoboken, N. J.
Schieren, Chas A, Co, 30–39 Ferry St, New York, N. Y.
Steel Improvement & Forge Co, Addison Rd, Cleveland, Ohio
U. S. Indestructible Gasket & Mfg Co, 829 E 15th St, Brooklyn, N. Y.
Union Asbestos & Rubber Co, 1821 So 54th Ave, Cicero, Ill.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.
Vellumoid Co, 54 Rockdale St, Worcester, Mass.
Victor Mfg & Gasket Co, Roosevelt Rd, Chicago, Ill.
Wilmington Fibre Specialty Co, Wilmington, Del.

GATE VALVES

(See Valves, Gate)

GEAR UNITS, POWER-TRANSMISSION

Allis-Chalmers Mfg Co, Milwaukee, Wis.
De Laval Steam Turbine Co, Trenton, N. J.
General Electric Co, Schenectady, N. Y.
Jones, W A, Foundry & Mach Co, 4423 W Roosevelt Rd, Chicago, Ill.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kan.
Moore Steam Turbine Corp, 37 Coats St, Wellsville, N. Y.
Philadelphia Gear Works, Erie Ave & G St, Philadelphia, Pa.
Terry Steam Turbine Co, Box 1200, Hartford, Conn.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.

Atlantic Gear Works, Inc, 128 Lafayette St, New York, N. Y.
Boston Gear Works, Inc, North Quincy, Mass.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Cleveland Worm & Gear Co, Cleveland, Ohio
Falk Corp, 3104 W Canal St, Milwaukee, Wis.
Farrel-Birmingham Co, Inc, Ansonia, Conn.
Foote Bros Gear & Machine Co, S Western Blvd, Chicago, Ill.
Horsburgh & Scott Co, Cleveland, Ohio
Merkle-Korff Gear Co, 214 N Morgan St, Chicago, Ill.
Mesta Machine Co, Pittsburgh, Pa.
Morrison Machine Co, Paterson, N. J.
Palmer-Bee Co, Detroit, Mich.
Pittsburgh Gear & Machine Co, Pittsburgh, Pa.
Poole Foundry & Machine Co, Baltimore, Md.
Smith, Winfield H, 330 West St, Springville, N. Y.
Universal Gear Corp, 1477 E 19th St, Indianapolis, Ind.
Vickers, Inc, Detroit, Mich.
Waldron, John, Corp, Box 110, New Brunswick, N. J.
Watson-Flagg Machine Co, Paterson, N. J.

GENERATORS, ELECTRIC

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Columbia Electric Mfg Co, 4519 Hamilton Ave, Cleveland, O.
Crocker-Wheeler Electric Mfg Co, Ampere, N. J.
Electric Machinery Mfg Co, 1331 Tyler St N E, Minneapolis, Minn.
Elliott Co, Jeannette, Pa.
Erie Electric Co, 124 Church St, Buffalo, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Moore Steam Turbine Corp, 37 Coats St, Wellsville, N. Y.
Reliance Electric & Engrg Co, 1068 Ivanhoe Rd, Cleveland, O.
Terry Steam Turbine Co, Box 1200, Hartford, Conn.
Troy Engine & Machine Co, 142 Railroad Ave, Troy, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Caterpillar Tractor Co, 1940 Walker Ave, Peoria, Ill.
Century Electric Co, 1806–12 Pine St, St. Louis, Mo.
Continental Electric Co, 321 Ferry St, Newark, N. J.
Diehl Mfg Co, Elizabethport, N. J.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Harnischfeger Corp, Milwaukee, Wis.

GLASS TUBING

(See Tubing, Glass)

GLASSES, GAGE

Corning Glass Works, Dept IP, Corning, N. Y.
Diamond Power Specialty Corp, Box 288, Detroit, Mich.
Huyette, Paul B, Co, Inc, 403 N Broad St, Phila, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.
Chesterton, A W, Co, 64 India St, Boston, Mass.
Cincinnati Gasket & Packing Co, Cincinnati, Ohio
Durabla Mfg Co, Room 202, 114 Liberty St, New York, N. Y.
Ernst Water Column & Gage Co, Livingston, N. J.
Klingerit, Inc, 16 Hudson St, New York, N. Y.
Stets Co, Inc, Milk St, Boston, Mass.

GLOBE VALVES

(See Valves, Globe)

GLOVES, ASBESTOS

Johns-Manville, 22 E 40 St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
Linde Air Products Co, 30 E 42nd St, New York, N. Y.

GLOVES, RUBBER

Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Pangborn Corp, Box 3809, Hagerstown, Md.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.

GOVERNORS, AIR-COMPRESSOR

Foster Engrg Co, 109 Monroe St, Newark, N. J.
Gardner-Denver Co, 100 Gardner Drive, Quincy, Ill.
General Electric Co, Schenectady, N. Y.
Jarecki Mfg Co, Erie, Pa.
Pickering Governor Co, Dept M, Portland, Conn.
Grove Regulator Co, 1729 Poplar St, Oakland, Calif.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Westinghouse Air Brake Co, Wilmerding, Pa.

GOVERNORS, ENGINE, INTERNAL-COMBUSTION

Pickering Governor Co, Dept M, Portland, Conn.
Handy Governor Corp, Detroit, Mich.
Massey Machine Co, 789 Pearl St, Watertown, N. Y.
Pierce Governor Co, Anderson, Ind.
Woodward Governor Co, Rockford, Ill.

GOVERNORS, ENGINE, STEAM

Gardner-Denver Co, Quincy, Ill.
Pickering Governor Co, Dept M, Portland, Conn.
Askania Regulator Co, S Michigan Ave, Chicago, Ill.
Filer & Stowell Co, 147 E Becher St, Milwaukee, Wis.
Grove Regulator Co, 1729 Poplar St, Oakland, Calif.
Massey Machine Co, 789 Pearl St, Watertown, N. Y.
Waters Governor Co, 1123 Oliver Bldg, Boston, Mass.
Woodward Governor Co, Rockford, Ill.

GOVERNORS, PUMP

Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Chaplin-Fulton Mfg Co, 28-40 Penn Ave, Pittsburgh, Pa.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Gardner-Denver Co, Quincy, Ill.
Jarecki Mfg Co, Erie, Pa.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Squires, C E, Co, E 40th St & Kelley Ave, Cleveland, Ohio
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Defender Automatic Regulator Co, St. Louis, Mo.
d'Este, Julian, Co, 6 Spice St, Charlestown, Mass.
Dunham, C A, Co, E Ohio St., Chicago, Ill.
Grove Regulator Co, 1729 Poplar St, Oakland, Calif.
Keckley, O C, Co, Washington Blvd, Chicago, Ill.
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Kitts Steam Specialty Co, 272 W Second St, Oswego, N. Y.
Leahy Mfg Co, E 8th St, Los Angeles, Calif.
Mercon Regulator Co, 2357 N 29th St, Milwaukee, Wis.
Mueller Co, Decatur, Ill.
Plouff Co, Columbus Ave, Boston, Mass.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Chicago, Ill.
Spence Engrg Co, Inc, 61 St, Walden, N. Y.
Staples & Pfeiffer, Ltd, Bryant St, San Francisco, Calif.
Waters Governor Co, 1123 Oliver Bldg, Boston, Mass.
Watts Regulator Co, Lawrence, Mass.
Williams Gauge Co, 1938 Pennsylvania Ave, N S, Pittsburgh, Pa.
Wright-Austin Co, Detroit, Mich.

GOVERNORS, STEAM-TURBINE

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
De Laval Steam Turbine Co, Trenton, N. J.
Elliott Co, Jeannette, Pa.
General Electric Co, Schenectady, N. Y.
Pickering Governor Co, Dept M, Portland, Conn.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Askania Regulator Co, 16th Street & S Michigan Ave, Chicago, Ill.
Massey Machine Co, 789 Pearl St, Watertown, N. Y.
Woodward Governor Co, Rockford, Ill.

GOVERNORS, WATER-WHEEL

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Pickering Governor Co, Dept M, Portland, Conn.
Baldwin-Southwark Corp, Philadelphia, Pa.
Holyoke Machine Co, Holyoke, Mass.
Lombard Governor Co, Ashland, Mass.
Pelton Water Wheel Co, San Francisco, Calif.
Smith, S Morgan, Co, 500 Lincoln St, York, Pa.
Woodward Governor Co, Rockford, Ill.

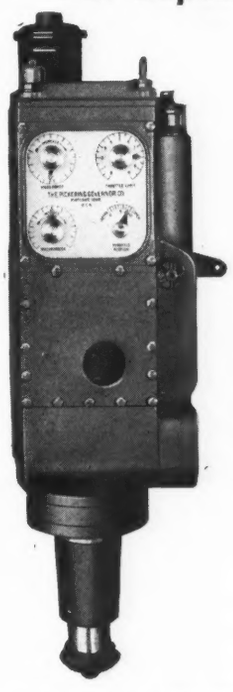
COPALTITE *Makes*
TIGHT JOINTS AT 7,500 lbs. 1,500° F

Tight joints without gaskets are possible with COPALTITE at a cost of only a few cents per joint. A thin film of this remarkable compound provides an effective joint that remains plastic and unaffected by vibration, contraction or expansion. COPALTITE will hold high pressures and temperatures—and is a perfect seal for steam, salt brine, gasoline, freon, alkalis, gases or dilute acids. Send for a 7 oz. trial tube today. FREE if not completely satisfactory.

ALSO MAKERS OF:
TEMPSEAL
The pressure-proof Refractory and Insulating Cement
RODPAX
The One Metallic Plastic Packing for Stuffing Boxes

NATIONAL ENGINEERING PRODUCTS INC.
COMMERCE & SAVINGS BLDG. WASHINGTON, D. C.

PICKERING GOVERNORS
For Dependable Operation



Plain Mechanical Isochronous Oil Relay
for
Steam Engines
Steam Turbines
Diesel Engines
Gas Engines

Speed Responsive Governors for all purposes. . . .

THE PICKERING GOVERNOR CO.
Portland, Conn.

Here's ECONOMICAL LUBRICATION

You want economical lubrication—not just cheap lubricants. Use Dixon's Graphited Lubricants—that stand up better—cutting power costs, maintenance costs, and cost-per-year of lubricant.

Dixon's Ticonderoga Flake Lubricating Graphite for cylinder and bearing lubrication, packings, gaskets, threaded joints, etc.

Particle Size No. 1—large, unctuous flakes.
Particle Size No. 2—finely subdivided powdered flakes.

Dixon's Cup and Pressure Gun Graphited Grease—Insoluble in water, hence ideal for all outdoor as well as indoor machinery. Retains consistency at all temperatures. Lasts longer than plain grease. In six consistencies.

Dixon's L&P (Lubricating and Penetrating) Graphited Oil—Quick-Action rust solvent, rust preventive, and lubricant for general industrial, household and automotive use. In handy 3-oz. or pint squirt cans, or in large quantities.

GRAPHITE is the Answer

Natural flake graphite, used alone, is the ideal lubricant for many applications. Mixed with oil or grease, it provides lubricants of unsurpassed qualities—lubricants that will stand up where plain oils or greases squeeze out, wash out, or melt out.

Dixon's Pipe Joint Graphite Compound—tightly seals all flanged, gasketed and threaded joints against steam, gas, air, acid, alkalies, brine, and all aqueous solvents. Enables easy disassembling of joints years later.

Dixon's Graphite Seal—performs same function as Dixon's Pipe Joint Graphite Compound, but is impervious to hot and cold oil, gasoline, and all non-aqueous solvents.

Dixon's Solid Belt Dressing—handy, giant bar held against running belt reduces slip, lengthens belt life, will not harden or crack belt even after years of use.

Write for Booklet KP-94

JOSEPH DIXON CRUCIBLE CO.
JERSEY CITY • NEW JERSEY

DIXON'S GRAPHITE PRODUCTIONS

SEND FOR CIRCULARS

164

GRAPHITE, LUBRICATING

Dixon, Joseph, Crucible Co, 170 Wayne St, Jersey City, N. J.
Acheson Colloids Corp, Port Huron, Mich.
U. S. Graphite Co, Saginaw, Mich.

GRATES

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Brownell Co, 301 N Findlay St, Dayton, Ohio
Canton Stoker Corp, 741 Andrew Pl, Canton, Ohio
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Murray Iron Works Company, Burlington, Iowa
Springfield Boiler Co, Springfield, Ill.
Bass Foundry & Machine Co, Fort Wayne, Ind.
Cyclone Grate-Bar Co, Jefferson Ave, Buffalo, N. Y.
Godfrey Keeler Co, Inc, 77 Warren St, New York, N. Y.
Hulson Grate Co, Keokuk, Iowa
International Engrg Works, Inc, Framingham, Mass.
Kramer Bros Foundry Co, Dayton, Ohio
McClave-Brooks Co, Scranton, Pa.
Marion Machine, Foundry & Supply Co, Marion, Ind.
Meehanite Corp, Pittsburgh, Pa.
Milwaukee Boiler Mfg Co, S 41st St, Milwaukee, Wis.
New England Roller Grate Co, Indian Orchard, Mass.
Nute, McGehee, Geary Co, Inc, Chambersburg, Pa.
Perfection Grate & Stoker Co, Springfield, Mass.
Thomas Foundries, Inc, Birmingham, Ala.
Titusville Iron Works Co, Titusville, Pa.
Treadwell, M H, Co, 140 Cedar St, New York, N. Y.
Webster, Howard J, Green & Hortter Sts, Phila, Pa.
Wickes Boiler Co, 512 N Water St, Saginaw, Mich.

GRATES, WASTE-FUEL

Hofft, M A, Co, Georgia & West Sts, Indianapolis, Ind.

GRATING, FLOOR

Arrowhead Iron Works, Kansas City, Mo.
Beach-Russ Co, 50 Church St, New York, N. Y.
Blaw-Knox Co, 1525 Pennsylvania Ave, Pittsburgh, Pa.
Carnegie-Illinois Steel Co, Pittsburgh, Pa.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Goldens' Foundry & Machine Co, Columbus, Ga.
Hendrick Mfg Co, Carbondale, Pa.
Irving Subway Grating Co, 50-09 27th, Long Island City, N. Y.
Kerlow Steel Flooring Co, 240 Culver Ave, Jersey City, N. J.
Klemp, Wm F, Co, S Melvina Ave, Chicago, Ill.
Meehanite Corp, Pittsburgh, Pa.
Tri-Lok Co, Butler St, Pittsburgh, Pa.

GREASE

Cities Service Oil Co, 60 Wall Tower, New York, N. Y.
Macmillan Petroleum Corp, 530 W 6th St, Los Angeles, Calif.
Shell Oil Co, 50 W 50th St, New York, N. Y.
Socony-Vacuum Oil Co, Inc, 26 Broadway, New York, N. Y.
Standard Oil Co, Ind., 910 S. Michigan Ave, Chicago, Ill.
Texas Co, 135 E 42nd St, New York, N. Y.
Tidewater Assoc Oil Co, 17 Battery Place, New York, N. Y.
Borne Scrymser Co, 17 Battery Place, New York, N. Y.
Chard & Howe, 88 Van Dyke St, Brooklyn, N. Y.
Cook's, Adam, Sons, 52 Vanderbilt Ave, New York, N. Y.
Fiske Bros Refining Co, 129 Lockwood St, Newark, N. J.
Franklin Oil & Gas Co, Bedford, Ohio
Galena Oil Corp, Cincinnati, O.
Harris, A W, Oil Co, P O Box 1295, Providence, R. I.
Houghton, E F, & Co, 244-50 Somerset St, Phila, Pa.
Hulburt Oil & Grease Co, Philadelphia, Pa.
Ilsley, Doubleday & Co, 56 Nurge Ave, Maspeth, Que[illegible] N. Y.
Ironsides Co, 270 W Mound Columbus, Ohio
Kellogg, E H, & Co, 93 Wa[illegible] St, New York, N. Y.
Keystone Lubricating Co, [illegible] & Clearfield, Phila, Pa.
Metalene Chemical Co, Cle[illegible] land, Ohio
N. Y. & N. J. Lubricant Co, [illegible] Madison Ave, New Yo[illegible] N. Y.
Ohio Grease Co, Loudonville, [illegible]
Pennzoil Co, Oil City, Pa.
Sinclair Refining Co, 630 [illegible] Ave, New York, N. Y.
Standard Oil Co of N. J., [illegible] Broadway, New York, N. [illegible]
Stewart Warner Corp, 1826-1852 Diversey Pkwy, Chicago, Ill.
Sun Oil Co, Philadelphia, Pa.
Swan-Finch Oil Corp, R C A Bldg, West, New York, N. Y.
Valvoline Oil Co, Cincinnati, Ohio

GREASE CUPS

(See Cups, Grease)

GREASE, GRAPHITE

Dixon, Joseph, Crucible Co, 170 Wayne St, Jersey City, N. J.
Pure Oil Co, Chicago, Ill.
Standard Oil Co, Ind., 910 S Michigan Ave, Chicago, Ill.
Acheson Colloids Corp, Port Huron, Mich.
Galena Oil Corp, Cincinnati, O.
Harris, A W, Oil Co, Providence, R. I.
Ohio Grease Co, Loudonville, O.
Stewart Warner Corp, 1826-1852 Diversey Pkwy, Chicago, Ill.
U. S. Graphite Co, Saginaw, Mich.

GREASE-REMOVING COMPOUNDS

(See Compounds)

GREASE, ROPE

Cities Service Oil Co, 60 Wall Tower, New York, N. Y.
Pure Oil Co, Chicago, Ill.
Standard Oil Co, Ind, 910 S Michigan Ave, Chicago, Ill.
Acheson Colloids Corp, Port Huron, Mich.
Chard & Howe, 88 Van Dyke St, Brooklyn, N. Y.
Fiske Bros Refining Co, 129 Lockwood St, Newark, N. J.
Franklin Oil & Gas Co, Bedford, Ohio
Ironsides Co, Columbus, Ohio
Stewart Warner Corp, 1826-1852 Diversey Pkwy, Chicago, Ill.

GRINDERS, PNEUMATIC, ELECTRIC, PORTABLE

Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Buckeye Portable Tool Co, Dayton, Ohio
Cleveland Pneumatic Tool Co, Cleveland, Ohio
Diehl Mfg Co, Elizabethport, N. J.
Dumore Co, Racine, Wis.
Helwig Mfg Co, St Paul, Minn.
Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.
Independent Pneumatic Tool Co, W Jackson Blvd, Chicago, Ill.
Madison-Kipp Corp, Madison, Wis.
Mall Tool Co, S Chicago Ave, Chicago, Ill.
Millers Falls Co, 59 Wells St, Greenfield, Mass.
Norton Co, Worcester, Mass.
Safety Grinding Wheel & Machine Co, Springfield, Ohio
Stanley Works, New Britain, Conn.
Standard Electrical Tool Co, 1918 W 8th St, Cincinnati, O.
Syntron Co, 492 Lexington Ave, Homer City, Pa.

U. S. Electrical Motors, 200 E Slauson Ave, Los Angeles, Cal.

GUNS, GREASE

Lincoln Engrg Co, 5701 Natural Bridge, St Louis, Mo.
Royersford Foundry & Machine Co, Royersford, Pa.
Stewart Warner Corp, 1826-1852 Diversey Pkwy, Chicago, Ill.

GUNS, METAL-SPRAY

Master Metal Spray Co, 2527 Magnolia St, Oakland, Calif.
Metallizing Co of America, Inc, Box 822 A, Los Angeles, Cal.
Metallizing Engrg Co, 21-07 41st Ave, Long Island City, N. Y.
Metals Coating Co of America, Philadelphia, Pa.
Metalspray Co, 113 Llewellyn St, Los Angeles, Calif.
Schori Process Corp, 8-11 43rd Rd, Long Island City, N. Y.

HAMMERS, PNEUMATIC, ELECTRIC, PORTABLE

Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Barco Mfg Co, 1802½ Winnemac Ave, Chicago, Ill.
Cleveland Pneumatic Tool Co, Cleveland, Ohio
Dayton Pneumatic Tool Co, 7 Norwood Ave, Dayton, Ohio
Franklin Machine Co, Providence, R. I.
Helwig Mfg Co, St Paul, Minn.
Independent Pneumatic Tool Co, W Jackson Blvd, Chicago, Ill.
Keller, William H, Inc, Grand Haven, Mich.
King Pneumatic Tool Co, N Ashland Ave, Chicago, Ill.
Madison-Kipp Corp, Madison, Wis.
Millers Falls Co, 59 Wells St, Greenfield, Mass.
Mueller Co, Decatur, Ill.
Syntron Co, 492 Lexington Ave, Homer City, Pa.
Whitney, W A, Mfg Co, Rockford, Ill.

HANGERS, PIPE

Grinnell Co, Inc, 277 W Exchange St, Providence, R. I.
Jarecki Mfg Co, Erie, Pa.
Kellogg, M W, Co, Jersey City, N. J.
National Valve & Mfg Co, 3102 Liberty Ave, Pittsburgh, Pa.
Clow, James B, & Sons, N. Talman Ave, Chicago, Ill.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
McDougall & Potter Co, 141st St & Rider Ave, New York, N. Y.
Pittsburgh Valve & Fittings Corp, Barberton, Ohio
Rockwood Sprinkler Co, 54 Harlow St, Worcester, Mass.

HANGERS, SHAFT, & PILLOW BLOCKS

Jones, W A, Foundry & Machine Co, 4423 W Roosevelt Rd, Chicago, Ill.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Standard Pressed Steel Co, Jenkintown, Pa.
Ahlberg Bearing Co, Chicago, Ill.
American Pulley Co, Phila, Pa.
Barry Co, Muscatine, Iowa.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Bass Foundry & Machine Co, Fort Wayne, Ind.
Bond, Charles, Co, Phila, Pa.
Boston Gear Works, Inc, North Quincy, Mass.
Caldwell, W E, Co, 280 Brandeis St, Louisville, Ky.
Carey, W W, Co, Lowell, Mass.
Chicago Pulley & Shafting Co, Chicago, Ill.
Clizbe Bros Mfg Co, Plymouth, Ind.
Dick, R & J, Co, Passaic, N. J.
Dodge Mfg Corp, Mishawaka, Ind.
Falls Clutch & Machinery Co, Cuyahoga Falls, Ohio
Farrel-Birmingham Co, Inc, Ansonia, Conn.
Fast Bearing Co, Baltimore, Md.
Franklin Machine Co, Providence, R. I.
Goldens' Foundry & Machine Co, Columbus, Ga.
Great Western Mfg Co, Leavenworth, Kan.
H & C Machinery & Engrg Co, 281 Passaic St, Newark, N. J.
Hill Clutch Machine & Foundry Co, Cleveland, Ohio
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio
Kingsbury Machine Works, 4324 Tackawanna St, Phila, Pa.
Lamson Co, Syracuse, N. Y.
Medart Co, 3548 De Kalb St, St Louis, Mo.
Palmer-Bee Co, Detroit, Mich.
Randall Graphite Products Corp, Chicago, Ill.
Sackett, A J, & Sons, Baltimore, Md.
Smith, Winfield H, Inc, 330 West St, Springville, Ohio
Sprout, Waldron & Co, Muncy, Pa.
Wood's, T B, Sons Co, 1165 5th Ave, Chambersburg, Pa.

HEADS, EXHAUST

Maxim Silencer Co, 85 Homestead Ave, Hartford, Conn.
Straight Line Foundry & Machine Corp, 218 S Geddes St, Syracuse, N. Y.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Taylor Forge & Pipe Works, P O Box 485, Chicago, Ill.
Atwood & Morrill Co, Salem, Mass.
Burt Mfg Co, 232 Main St, Akron, Ohio
Hoppes Mfg Co, Belmont Ave, Springfield, Ohio
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Kirk & Blum Mfg Co, 283 Spring Grove Ave, Cincinnati, Ohio
Milwaukee Steam Appliance Co, West Allis, Wis.
Plouff Co, Columbus Ave, Boston, Mass.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Sly, W W, Mfg Co, 4724 Train Ave, Cleveland, Ohio
Wright-Austin Co, Detroit, Mich.

HEAT EXCHANGERS

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Elgin Softener Corp, 55 North St, Elgin, Ill.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Henzey Co, Dept H-14, Watertown, Wis.
Kellogg, M W, Co, Jersey City, N. J.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kan.
Pennsylvania Pump & Compressor Co, Easton, Pa.
Prat-Daniel Corp, 80 S Water St, Port Chester, Pa.
Scaife, Wm B, & Sons Co, River & Ann St, Oakmont, Pa.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
Alco Products Div, 36 Church St, New York, N. Y.
Andale Co, Philadelphia, Pa.
Braun, C F & Co, 1000 S Fremont Ave, Alhambra, Calif.
Croll-Reynolds Engrg Co, 17 John St, New York, N. Y.
Davis Engrg Corp, 1064-16 E Grand St, Elizabeth, N. J.
Devine, J P, Mfg Co, Inc, Mt Vernon, Ill.
Duriron Co, Inc, Dayton, Ohio
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Heilman Boiler Works, Allentown, Pa.

TIME TESTED. RELIABLE and INEXPENSIVE

GREASE CUPS

WRITE for DETAILS and PRICE LIST

Buy 4 of these cups for about the price of one brass cup! Drawn-steel, cadmium plated . . . *never known to rust* —and they're *standard in entire industries!* "SHURFLO" for service where grit, dust or lint is a problem; "AIRSPRING" for ordinary uses.

HUNTER PRESSED STEEL CO., Lansdale, Pennsylvania

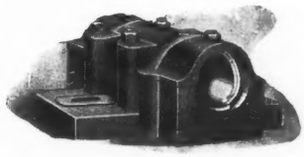
"STANDCO" PILLOW BLOCKS

"Standco" Heavy Rigid Pillow Blocks Babbitted bearing surface—one end faced.

Made in a wide range of types and sizes for practically every need. Sturdy construction. Backed by many years experience in the production of power transmission equipment.

Write for descriptive bulletin.

"Standco" Ball and Socket Pillow Block Ring or Wick Oiling, Plain or Collar End—Babbitted Bearings.



"Standco" Rigid Ring Oiling Pillow Blocks Reamed Babbitted Bearings

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA.

Box 577

BOSTON DETROIT ST. LOUIS INDIANAPOLIS SAN FRANCISCO CHICAGO

Hoppes Mfg Co, Belmont Ave, Springfield, Ohio
Key Co, Alta Sita, E St Louis, Ill.
Leader Iron Works, Inc, Decatur, Ill.
Leahy Mfg Co, E 8th St, Los Angeles, Calif.
Lummus Co, 420 Lexington Ave, New York, N. Y.
Midwest-Fulton Machine Co, Dayton, Ohio
Petroleum Iron Works Co, Sharon, Pa.
Richmond Engrg Co, 7th & Hospital Sts, Richmond, Va.
Rome-Turney Radiator Co, 200 Lynch St, Rome, N. Y.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schubert-Christy Corp, 1600 Georgia St, Affton Station, St Louis, Mo.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Squier, Geo L, Mfg Co, Buffalo, N. Y.
Struthers-Wells Titusville Corp, Warren, Pa.
Treadwell Construction Co, Midland, Pa.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.
Yates American Machine Co, Beloit, Wis.

HEAT-RESISTANT PAINTS

(See Paints, Heat-Resistant)

HEAT INSULATION

(See Insulation)

HEATERS, AIR

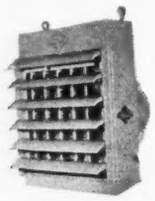
(See Preheaters, Air)

HEATERS, DEAERATING

Brownell Co, 301 N Findlay St, Dayton, Ohio

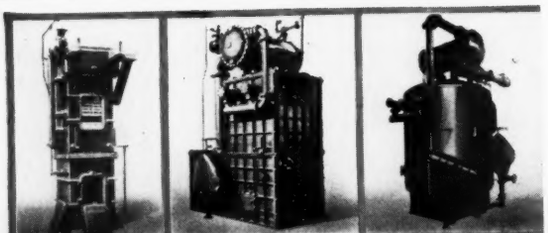
UNIT HEATERS

Everything Electrical
GraybaR QUALITY Since 1886 GraybaR ELECTRIC COMPANY



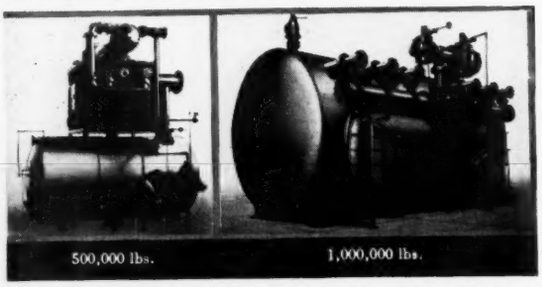
One item of the Graybar 60,000.
For economical plant heating we have quickly available the well known IIg line of unit heaters

DISTRIBUTED BY
GraybaR ELECTRIC COMPANY
IN 83 PRINCIPAL CITIES



COCHRANE DEAERATORS and DEAERATING HEATERS

Conditioning of water and steam for industrial plants is a specialized field in which Cochrane has been engaged for a half century. Cochrane Deaerators and Deaerating Heaters are unsurpassed for dependable everyday peformance (so essential for the continued protection of the modern boiler). They are built in a variety of types and sizes to serve the need of every plant requiring water treatment.



COCHRANE CORP., 3106 N. 17th St., Philadelphia, Pa.

COCHRANE

Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Condenser Service & Engrg Co, 310 12th St, Hoboken, N. J.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Permutit Co, Dept A, 330 W 42nd St, New York, N. Y.
Stickle Steam Specialties Co, 2217 Valley Ave, Indianapolis, Ind.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Worthington Pump & Machinery Corp, Harrison, N. J.
Bass Foundry & Machine Co, Fort Wayne, Ind.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Hoppes Mfg Co, Belmont Ave, Springfield, Ohio
Lummus Co, 420 Lexington Ave, New York, N. Y.
Power Plant Specialty Corp, 1390-440 S Dearborn St, Chicago, Ill.

HEATERS, FEEDWATER

Brownell Co, 301 N Findlay St, Dayton, Ohio
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Condenser Service & Engrg Co, 310 12th St, Hoboken, N. J.
Elliott Co, Jeannette, Pa.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Graver Tank & Mfg Co, Inc, East Chicago, Ind.
Harrisburg Steel Corp, Harrisburg, Pa.
Stickle Steam Specialties Co, 2217 Valley Ave, Indianapolis, Ind.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
Alco Products Div, 36 Church St, New York, N. Y.
Braun, C F, & Co, 1000 S Fremont Ave, Alhambra, Calif.
Croll-Reynolds Engrg Co, 17 John St, New York, N. Y.
Davis Engrg Corp, 1064-16 E Grand St, Elizabeth, N. J.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Hoppes Mfg Co, Belmont Ave, Springfield, Ohio
International Engrg Works Inc, Framingham, Mass.
Kroeschell Boiler Co, Racine, Wis.
Lummus Co, 420 Lexington Ave, New York, N. Y.
Marshall Heater Co, Dayton, O.
Midwest-Fulton Machine Co, Dayton, Ohio
Milwaukee Reliance Boiler Works, Milwaukee, Wis.
Power Plant Specialty Co, 1390-440 S Dearborn, Chicago, Ill.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Watts Regulator Co, Lawrence, Mass.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.
Willamette Iron & Steel Corp, Portland, Ore.

HEATERS, OIL

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
National Airoil Burner Co, 1327 Girard Ave, Philadelphia, Pa.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
Alco Products Div, 36 Church St, New York, N. Y.
Andale Co, Philadelphia, Pa.
Bethlehem Steel Co, Bethlehem, Pa.
Braun, C F, & Co, 1000 S Fremont Ave, Alhamora, Calif.
Coen Co, 42 Boardman Place, San Francisco, Calif.
Combustion Equipment Co, 1820 Cherry St, Kansas City, Mo.
Davis Engrg Corp, 1064-16 E Grand St, Elizabeth, N. J.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Hauck Mfg Co, 126 10th St, Brooklyn, N. Y.
Hynes Electric Heating Co, Philadelphia, Pa.
Johnson, S T, Co, 940 Arlington, Oakland, Calif.
Leahy Mfg Co, E 8th St, Los Angeles, Calif.
Lummus Co, 420 Lexington Ave, New York, N. Y.
McDermott Water Heaters, Inc, 1819 Broadway, New York, N. Y.
Mahr Mfg Co, Minneapolis, Minn.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schutte & Koerting Co, 12th & Thompson Sts, Philadelphia, Pa.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Tate-Jones & Co, 23 Broad St, Leetsdale, Pa.
Trent, Harold E, Co, N 54th St at Poplar, Philadelphia, Pa.
Watts Regulator Co, Lawrence, Mass.

HEATERS, UNIT

American Blower Corp, 6000 Russell St, Detroit, Mich.
Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Clarage Fan Co, 621 Porter St, Kalamazoo, Mich.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Fedders Mfg Co, 63 Tonawanda St, Buffalo, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Sturtevant Co, B F, 47 Readville St, Hyde Park, Boston, Mass.
Unit Heater & Cooler Co, Wausau, Wis.
Webster, Warren, & Co, Camden, N. J.
Airtherm Mfg Co, 1497 S Vanderventer Ave, St Louis, Mo.
Bayley Blower Co, 1817 S 66 St, Milwaukee, Wis.
Bryant Heater Co, 17825 St Clair Ave, Cleveland, Ohio
Carrier Corp, Syracuse, N. Y.
Johnson Fan & Blower Corp, Dept P, 1319 W Lake, Chicago, Ill.
Kisco Co, 3736 Chouteau Ave, St Louis, Mo.
McCord Radiator & Mfg Co, Detroit, Mich.
Modine Mfg Co, Racine, Wis.
Natural Gas Equipment, Inc, 539 Petroleum Securities Bldg, Los Angeles, Calif.
Nelson, Herman, Corp, 1824 Horton Ave, Moline, Ill.
Nesbitt, John J, Inc, State Rd & Rhawn St, Philadelphia, Pa.
Rome-Turney Radiator Co, 200 Lynch St, Rome, N. Y.
Skinner Heating & Ventilating Co, 1990 N 9th, St Louis, Mo.
Surface Combustion Corp, Sieloff St, Toledo, Ohio
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
U. S. Radiator Corp, Detroit, Mich.
Wing, L J, Mfg Co, W 14th St, & 7th Ave, New York, N. Y.

HEATERS, WATER-SUPPLY

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
American Radiator Co, 40 W 40th St, New York, N. Y.
Andale Co, Philadelphia, Pa.
Bell & Gossett Co, Chicago, Ill.
Bryant Heater Co, 17825 St Clair Ave, Cleveland, Ohio
Cox, Abram, Mfg Corp, Lansdale, Pa.
Croll-Reynolds Engrg Co, 17 John St, New York, N. Y.
Davis Engrg Corp, 1064-16 E Grand St, Elizabeth, N. J.
Eclipse Fuel Engrg Co, 707 So Main St, Rockford, Ill.
Johnson Corp, 865 Wood St, Three Rivers, Mich.
Johnson, S T, Co, 940 Arlington, Oakland, Calif.
McDermott Water Heaters, Inc, 1819 Broadway, New York, N. Y.
Quaker City Iron Works, Philadelphia, Pa.
Ross Heater & Mfg Co, 1409 West Ave, Buffalo, N. Y.
Sterling Engrg Co, Milwaukee, Wis.
Trent, Harold E, Co, North 54th St at Poplar, Phila, Pa.
Watts Regulator Co, Lawrence, Mass.

HEATING SYSTEMS, STEAM, VACUUM AND VAPOR

Webster, Warren, & Co, Camden, N. J.
Fortherm Mfg Co, 1497 S Vandeventer Ave, St Louis, Mo.
American Radiator Co, 40 W 40th St, New York, N. Y.
Barnes & Jones Inc, 128 Brookside Ave, Jamaica Plain, Mass.
Carrier Corp, Syracuse, N. Y.
Cox, Abram, Mfg Corp, Lansdale, Pa.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
Monash-Younker Co, Inc, W Congress St, Chicago, Ill.
Tallmadge, Webster, & Co, East Orange, N. J.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
U. S. Radiator Corp, Detroit, Mich.

HEMP PACKING

(See Packing, Hemp)

HOISTS, CHAIN

Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
American Chain Co, York, Pa.
American Hoist & Derrick Co, St Paul, Minn.
Beebe Bros, Inc, Seattle, Wash.
Bridgeport Chain & Mfg Co, Bridgeport, Conn.
Chisholm-Moore Hoist Corp, 6015 Fremont Ave, Tonawanda, N. Y.
Cleveland Crane & Engrg Co, Wickliffe, Ohio
Conco Engrg Works, Mendota, Ill.
Harrington Co, Philadelphia, Pa.
McCollum Hoist & Mfg Co, Downers Grove, Ill.
Reading Chain & Block Corp, Reading, Pa.
Robbins & Myers, Inc, Springfield, Ohio
Roeper Crane & Hoist Works, 1729 N Tenth St, Reading, Pa.
Union Mfg Co, New Britain, Conn.
Yale & Towne Mfg Co, Stamford, Conn.

HOISTS, ELECTRIC, PNEUMATIC

American Engrg Co, Aramingo Ave, Philadelphia, Pa.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
American Chain Co, York, Pa.
American Hoist & Derrick Co, St Paul, Minn.
Chisholm-Moore Hoist Corp, 6015 Fremont Ave, Tonawanda, N. Y.
Cleveland Crane & Engrg Co, Wickliffe, Ohio
Clyde Iron Works, Duluth, Minn.
Conco Engrg Works, Mendota, Ill.
Detroit Hoist & Machine Co, Detroit, Mich.
Dravo Corp, Pittsburgh, Pa.
Euclid Crane & Hoist Co, Euclid, Ohio
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio
Harnischfeger Corp, Milwaukee, Wis.
Harrington Co, Philadelphia, Pa.
Lidgerwood Mfg Co, Elizabeth, N. J.
Louden Machinery Co, Fairfield, Iowa.
McCollum Hoist & Mfg Co, Downers Grove, Ill.
Northern Engrg Works, Detroit, Mich.
O K Clutch & Machinery Co, Columbia, Pa.
Robbins & Myers, Inc, Springfield, Ohio
Roeper Crane & Hoist Works, 1729 N 10th St, Reading, Pa.
Shaw-Box Crane & Hoist Works, Reading, Pa.
Shepard Niles Crane & Hoist Corp, 453 Schuyler Ave, Montour Falls, N. Y.
Sullivan Machinery Co, Michigan City, Ind.
Union Mfg Co, New Britain, Conn.
Vulcan Iron Works, Wilkes-Barre, Pa.
Willamette Iron & Steel Corp, Portland, Ore.
Yale & Towne Mfg Co, Stamford, Conn.

HOISTS, SKIP

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow C O, Co, Cleveland, Ohio
Beaumont-Birch Co, 1505 Race St, Philadelphia, Pa.
Euclid Crane & Hoist Co, Euclid, Ohio
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio
Godfrey Conveyor Co, Dept A-77, Elkhart, Ind.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio
Lidgerwood Mfg Co, Elizabeth, N. J.
Palmer-Bee Co, Detroit, Mich.

HOPPERS, COAL AND ASH

American Engrg Co, Aramingo Ave, Philadelphia, Pa.
Chicago Bridge & Iron Co, 2454 Old Colony Bldg, Chicago, Ill.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Connery Construction Co, 2nd & Luzerne Sts, Phila, Pa.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Bergen Point Iron Works, Bayonne, N. J.
Bethlehem Steel Co, Bethlehem, Pa.
Bos-Hatten, Inc, Buffalo, N. Y.
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Burhorn, Edwin, Co, 1 Newark St, Hoboken, N. J.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Chattanooga Boiler & Tank Co, Box 110, Chattanooga, Tenn.
Colonial Iron Works, Cleveland, Ohio
Dover Boiler Works, 90 E Dickerson St, Dover, N. J.
Dravo Corp, Pittsburgh, Pa.
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Hahn Engrg Co, 30 Church St, New York, N. Y.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio
Leader Iron Works, Inc, Decatur, Ill.
Stover Steel Tank & Mfg Co, Freeport, Ill.
Treadwell, M H, Co, 140 Cedar St, New York, N. Y.
United Conveyor Corp, Dearborn & Van Buren St, Chicago, Ill.

HOSE, AIR

American Metal Hose Branch of American Brass Co, Waterbury, Conn.
Chicago Metal Hose Corp, 1312 3rd Ave, Maywood, Ill.
Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Manhattan Rubber Mfg Div, 94 Townsend St, Passaic, N. J.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Atlantic Metal Hose Co, 123 W 64th St, New York, N. Y.
Boston Woven Hose & Rubber Co, Cambridge, Mass.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, Norwood, Cincinnati, Ohio.
Continental Rubber Works, Erie, Pa.
Gates Rubber Co, Denver, Colo.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Mulconroy Co, 54th & Jefferson Sts, Philadelphia, Pa.
N. Y. Belting & Packing Co, Passaic, N. J.
Pennsylvania Flexible Metallic Tubing Co, Philadelphia, Pa.
Quaker City Rubber Co, Comly & Milnor Sts, Philadelphia, Pa.
Titeflex Metal Hose Co, Frelinghuysen Ave, Newark, N. J.
Westinghouse Air Brake Co, Wilmerding, Pa.

HOSE, FLEXIBLE METAL

(See Tubing, Flexible, Metal)

HOSE, FIRE

Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Manhattan Rubber Mfg Div, 94 Townsend St, Passaic, N. J.
Fabric Fire Hose Co, Sandy Hook, Conn.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Hamilton Rubber Mfg Co, Trenton, N. J.
Quaker City Rubber Co, Comly & Milnor Sts, Philadelphia, Pa.
Thermoid Co, Whitehead Rd, Trenton, N. J.
U S Rubber Co, 1792 Broadway, New York, N. Y.

HOSE, GASOLINE, OIL

Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Atlantic Metal Hose Co, Inc, 123 64th St, New York, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Mulconroy Co, 54th & Jefferson Sts, Philadelphia, Pa.
Pennsylvania Flexible Metallic Tubing Co, Powers Lane, Philadelphia, Pa.
Quaker City Rubber Co, Comly & Milnor Sts, Phila, Pa.
Titeflex Metal Hose Co, Frelinghuysen Ave, Newark, N. J.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.

HOSE, STEAM

American Metal Hose Branch of American Brass Co, Waterbury, Conn.
Chicago Metal Hose Corp, 1312 S Third Ave, Maywood, Ill.
Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Atlantic Metal Hose Co, Inc, 123 W 64th St, New York, N. Y.
Cincinnati Rubber Mfg Co, 4901 Franklin, Cincinnati, O.
Gates Rubber Co, Denver, Colo.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Mulconroy Co, 54th & Jefferson Sts, Philadelphia, Pa.
Pennsylvania Flexible Metallic Tubing Co, Philadelphia, Pa.
Thermoid Co, Whitehead Rd, Trenton, N. J.
Titeflex Metal Hose Co, Frelinghuysen Ave, Newark, N. J.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.

HOSE ACCESSORIES

Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Aero Supply Mfg Co, Corry, Pa.
Akron Brass Mfg Co, Wooster, O.
Boston Coupling Co, Boston, Mass.
Boston Woven Hose & Rubber Co, Cambridge, Mass.
Cleveland Pneumatic Tool Co, 78th St, Cleveland, Ohio
Dallett Co, Clearfield St, Philadelphia, Pa.
Dayton Pneumatic Tool Co, Dayton, Ohio.
De Vilbiss Co, Toledo, Ohio
Dixon Valve & Coupling Co, Philadelphia, Pa.
Hunt, C B, & Son, Salem, Ohio
King Pneumatic Tool Co, N Ashland Ave, Chicago, Ill.
Mulconroy Co, 54th & Jefferson Sts, Philadelphia, Pa.
Parker Appliance Co, Cleveland, Ohio
Sherman, H B, Mfg Co, Battle Creek, Mich.
Westinghouse Air Brake Co, Wilmerding, Pa.

Famous for their fuel saving ability!—and for trouble-free service year after year!

Widely used in factories, mills, warehouses, offices, stores, etc. Over 50 different sizes in both suspended and floor types.

Write for sales literature covering the many advantages of Clarage Heaters.

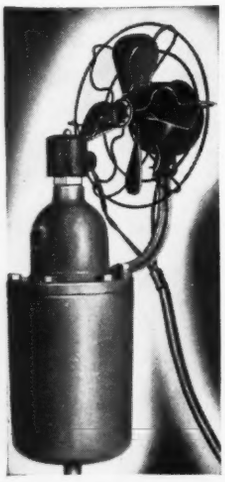
Suspended unit for smaller heating jobs.

Floor type unit for wide area heating.

CLARAGE FAN COMPANY
811 PORTER STREET • KALAMAZOO, MICH.
Sales Engineering Offices in all Principal Cities

Now! An Easy Way to End "DRY AIR" Complaints

IF YOU have complaints during the winter heating season about the drying out of materials . . . shrinkage and warping of boards . . . curling of flat material . . . brittleness of thread or filaments . . . trouble with static-charged machines, then it would be a good idea for you to know about Armstrong Steam Type Humidifiers.



Type K-2A

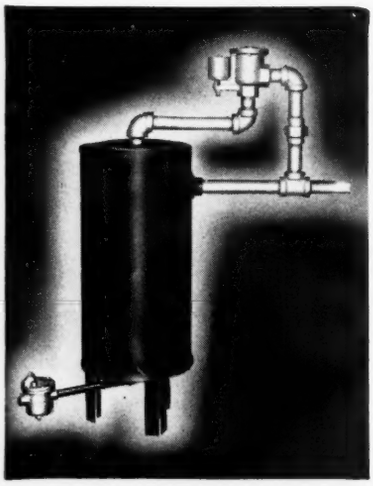
(Left)—This is a unit humidifier for overhead mounting in rooms heated by individual pipe coils or radiators. It is also ideal for mounting in front of individual unit heaters. Long rooms are taken care of by spacing these units at proper intervals.

LIST PRICE: $100.00, complete with Friez Humidistat, solenoid control valve, fan, strainer, and condensate drainage trap. Discounts on application.

Type K-4

(Right)—A large capacity unit well-suited for installations with central duct heating systems and with large floor type unit heaters.

LIST PRICE: $325.00, complete with Friez Humidistat, solenoid control valve, strainer, and condensate drainage trap. Discounts on application.



ARMSTRONG
STEAM TYPE
HUMIDIFIERS

ARMSTRONG MACHINE WORKS
812 Maple St., Three Rivers, Mich.

GENTLEMEN: I want to know more about Armstrong Humidifiers for my ..... plant. I have to humidify approximately ..... cu. ft. of space.

☐ Send suggestions, prices, etc.
☐ Have representative call on me.

Name .....
Company .....
Street .....
Town .....State .....

HUMIDIFIERS

American Blower Corp, 6000 Russell St, Detroit, Mich.
Armstrong Machine Works, 812 Maple St, Three Rivers, Mich.
Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Clarage Fan Co, 621 Porter St, Kalamazoo, Mich.
Grinnell Co, Inc, 277 W Exchange St, Providence, R. I.
Johnson Service Co, 509 E Michigan St, Milwaukee, Wis.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kan.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Bayley Blower Co, 1817 S 66th St, Milwaukee, Wis.
Murray, D J, Mfg Co, Wausau, Wis.
Spray Engrg Co, 111 Central St, Somerville, Mass.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.

HYDRAULIC COUPLINGS

(See Couplings)

HYDRAULIC TURBINES

(See Turbines, Hydraulic)

HYDRAULIC VALVES

(See Valves, Hydraulic)

ICE-MAKING SYSTEMS

Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Worthington Pump & Machinery Corp, Harrison, N. J.
Phoenix Ice Machine Co, Church Ave, Cleveland, Ohio
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

ICE TANKS

(See Tanks, Ice)

INDICATORS, ENGINE

American Instrument Co, Silver Springs, Md.
Bacharach Industrial Inst Co, 7000 Bennett, Pittsburgh, Pa.
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
R C A Mfg Co, Camden, N. J.
Robertson, Jas L, 3rd, 116 Broad St, New York, N. Y.
Trill Indicator Co, 38 E South St, Corry, Pa.

INDICATORS, POSITION, VALVE, DAMPER

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Tejax Engrg Corp, 1 Allens Ave, Providence, R. I.
Bristol Co, Waterbury, Conn.
Electric Tachometer Corp, Spring Garden St, Phila, Pa.

INDICATORS, POWER-FACTOR

General Electric Co, Schenectady, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Esterline-Angus Co, Box 5[illegible] Indianapolis, Ind.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.

INDICATORS, REMOTE LOAD, ETC

Bendix Aviation Corp, Marine Div, 754 Lexington Ave, Brooklyn, N. Y.

INDICATORS, SMOKE

(See Smoke Indicators)

INJECTORS

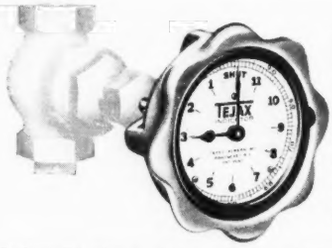
American Injector Co, Detroit, Mich.
Fischer & Porter Co, 61 W Penn St, Germantown, Phila, Pa.
Hancock Valve Div, Manning, Maxwell & Moore, 143 Elias St, Bridgeport, Conn.
Nathan Mfg Co, 250 Park Ave, New York, N. Y.
Ohio Injector Co, 150 Ohio Ave, Wadsworth, Ohio
Penberthy Injector Co, Detroit, Mich.
Randle Machinery Co, Cincinnati, Ohio
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.

INSTRUMENTS, ELECTRIC-MEASURING

Biddle, Jas G, Co, 1211-13 Arch St, Philadelphia, Pa.
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Columbia Electric Mfg Co, 4519 Hamilton Ave, Cleveland, Ohio
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Bristol Co, Waterbury, Conn.
Esterline-Angus Co, Box 596, Indianapolis, Ind.
Martindale Electric Co, 1385 Hird Ave, Cleveland, Ohio
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.

INSULATION, HEAT, PIPE-COVERING, BLANKETS, BLOCKS

Baldwin-Hill Co, 575 Klagg Ave, Trenton, N. J.
Carey, Philip Co, Lockland, O.
Eagle Picher Sales Co, PD-39, Temple Bar, Cincinnati, O.
Johns-Manville, 22 E 40th St, New York, N. Y.



TEJAX VALVES INDICATORS

Dial Indicating Handwheels and High-Lift V-Port Hand Regulating Valves.

Industrial plants all over the world are using Tejax Indicators as a solution to manual control problems . . . process work, breweries, refineries, power services, chemical plants, building . . . in hundreds of different applications, where you want the same result each time.

Send For New Bulletin

TEJAX ENGINEERING CORP.
2 Allens Ave. Providence, R. I.

Peasbey & Mattison Co, Butler Pike, Ambler, Pa.
Armstrong Cork Co, Lancaster, Pa.
Barrett Co, 40 Rector St, New York, N. Y.
Caret Magnesia Mfg Co, Valley Forge, Pa.
General Insulating & Mfg Co, Alexandria, Ind.
Nightingale & Childs, Inc, Cambridge, Mass.
Owens-Corning Fibreglas Co, Toledo, Ohio
Refractory & Insulation Corp, 381 4th Ave, New York, N. Y.
Standard Asbestos Mfg Co, 820 W Lake St, Chicago, Ill.
Union Asbestos & Rubber Co, 1821 S 54th Ave, Cicero, Ill.

INSULATORS, ELECTRIC

Corning Glass Works, Dept IP, Corning, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Colt's Patent Fire Arms Mfg Co, Hartford, Conn.
Continental-Diamond Fibre Co, Dept 18, Newark, Del.
Delta-Star Electric Co, Fulton St, Chicago, Ill.
G & W Electric Specialty Co, 7780 Dante Ave, Chicago, Ill.
Locke Insulator Corp, Baltimore, Md.
Ohio Brass Co, Mansfield, Ohio
Schweitzer & Conrad, 4433 N Ravenswood Ave, Chicago, Ill.
Western Rubber Co, Goshen, Ind.

INSURANCE, CASUALTY

(See Casualty Insurance)

JACKS

Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Blackhawk Mfg Co, Milwaukee, Wis.
Buda Co, Harvey, Ill.
Dudgeon, Richard, Inc, 24 Columbia St, New York, N. Y.
Duff-Norton Mfg Co, Pittsburgh, Pa.
Elmes, Charles F, Engrg Works, N Morgan St, Chicago, Ill.
Henderer's, A L, Sons, Wilmington, Del.
Joyce-Cridland Co, Dayton, Ohio
Messenger Bearings, Inc, Philadelphia, Pa.
Millers Falls Co, 59 Wells St, Greenfield, Mass.
Templeton, Kenly & Co, S Central Ave, Chicago, Ill.

JET CONDENSERS

(See Condensers, Jet)

JOINTS, EXPANSION

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Fulton Sylphon Co, Knoxville, Tenn.
Jarecki Mfg Co, Erie, Pa.
Kellogg, M W, Co, Jersey City, N. J.
Lunkenheimer Co, Cincinnati, O.
National Valve & Mfg Co, 3102 Liberty Ave, Pittsburgh, Pa.
Powell, Wm, Co, Cincinnati, O.
Shaw, Benjamin F, Co, 509 E Second St, Wilmington, Del.
Straight Line Foundry & Machine Co, 218 S Geddes St, Syracuse, N. Y.
Taylor Forge & Pipe Works, P O Box 485, Chicago, Ill.
Webster, Warren, & Co, Camden, N. J.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.
Alberger Heater Co, 287 Chicago St, Buffalo, N. Y.
Badger, E B, & Sons Co, 75 Pitts St, Boston, Mass.
Badger Fire Extinguisher Co, Boston, Mass.
Belfield, H, Co, N Broad St., Philadelphia, Pa.
Bordo, L J, Co, Glenside, Pa.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
Dresser Mfg Co, Bradford, Pa.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Harris, Arthur, & Co, N Aberdeen St, Chicago, Ill.
Howard Iron Works, Buffalo, N. Y.
Kopperman, Joseph & Sons, 312-316 New St, Philadelphia, Pa.
Parker Appliance Co, Cleveland.
Pittsburgh Valve & Fittings Corp, Barberton, Ohio
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Schutte & Koerting Co, 12th & Thompson Sts, Phila., Pa.

JOINTS, FLEXIBLE

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Taylor Forge & Pipe Works, P O Box 485, Chicago, Ill.
Barco Mfg Co, 1802½ Winnemac Ave., Chicago, Ill.
Bordo, L J, Co, Glenside, Pa.
U S Pipe & Foundry Co, Burlington, N. J.

JOINTS, PIPE, BALL

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Taylor Forge & Pipe Works, P O Box 485, Chicago, Ill.
Barco Mfg Co, 1802½ Winnemac Ave., Chicago, Ill.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
Spraying Systems Co, 4021C W Lake St, Chicago, Ill.

LACING, BELT

Rhoads, J E, & Sons, 35 N 6th St, Philadelphia, Pa.
Bristol Co, Waterbury, Conn.
Clipper Belt Lacer Co, Front Ave, N W, Grand Rapids, Mich.

YARWAY
GUN-PAKT
EXPANSION JOINTS

Wrought steel, cylinder guided. Gun-pakt and Gland-pakt types. Gun-pakt *(illustrated)*, the most revolutionary Expansion Joint development of the decade, has screw guns for plastic packing; may be packed while under full pressure. Gland-pakt has ring type packing. Sliding sleeves are chromium plated. Single and double end styles, flanged and welding ends, 2" to 24". Also all-brass in smaller sizes. Thousands in use. Proved by years of service.

Catalog EJ-1906.

See other Yarway Advertisements on pages 101, 184, 204, and 209.

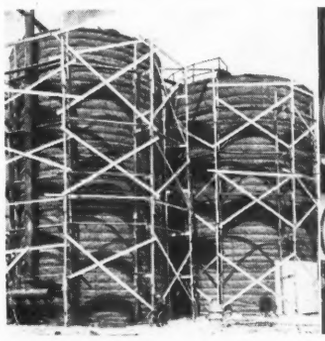
YARNALL-WARING COMPANY
100 MERMAID AVE., PHILA.

BALDWIN-HILL

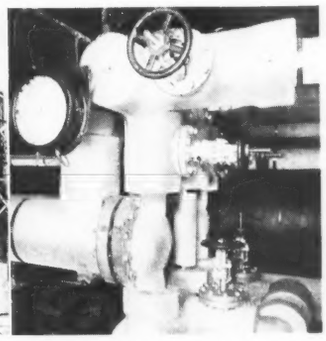
Heat Insulation Products

Specified by Engineers who must

● REDUCE POWER LOSSES ● CUT DOWN FUEL COSTS ● STEP UP EFFICIENCY



B-H Rockwool Blankets
For large areas, effective up to 1200° F. Carefully felted rockwool between various types of metal fabrics.



B-H No. 1 Insulating Cement
For small surfaces and odd shapes. Easy to mix and apply. Effective up to 1800° F. and reclaimable up to 1200° F.

B-H No. 100 Pipe Covering
Felted rockwool between metal lath for use on straight pipe runs of 2" or more in diameter. Comes in thicknesses of 1" to 4".

B-H Weatherseal
A durable weatherproof coating to protect insulated surfaces from disintegration and loss of efficiency.

Baldwin-Hill Heat Insulation Products have been developed and proved highly effective for providing high operating efficiencies by the elimination of preventable waste of heat and power. There is a type to meet every condition of service. For any specific application or a problem that is out of the ordinary, call in a Baldwin-Hill insulation engineer.

Makers Also of
B-H No. 7 INSULATING BLOCK
B-H INSULATING WOOL
Miscellaneous ASBESTOS
and DIATOMACEOUS EARTH Products

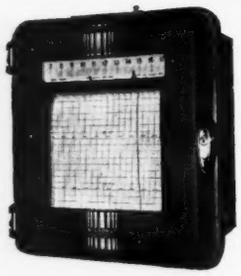
Send For Catalog Showing Complete Line

B-H INSULATION

BALDWIN-HILL CO.
575 KLAGG AVE., TRENTON, N. J.

RECORDERS

MICROMAX RECORDERS FOR FREQUENCY, LOAD, TEMPERATURE, FLOW AND pH



Micromax Strip-Chart Temperature Recorder

Micromax Round-Chart Frequency Recorder

These Micromax balance-type instruments are sturdy, motor-driven machines which indicate and record with reliability and accuracy. Their charts furnish detailed records in ink. The strip-chart Micromax can record as many as 16 points. Round-chart Micromax has an extra-bold indicating scale.

Standard instruments can be supplied to record: condensate purity, CO_2, current, flow, frequency, load, pH, phase angle, reactive KVA, speed, smoke density, temperature and voltage.

Write for catalogs.

LEEDS & NORTHRUP COMPANY
4987 Stenton Avenue, Philadelphia, Pa.

LEEDS & NORTHRUP

Coe & Brown Co, 202 George St, New Haven, Conn.
Crescent Belt Fastener Co, 247 Park Ave, New York, N. Y.
Detroit Belt Lacer Co, 3945-51 A St, Detroit, Mich.
Flexible Steel Lacing Co, 4607 Lexington St, Chicago, Ill.
Graton & Knight Co, Worcester, Mass.
Houghton, E F, & Co, 244-50 W Somerset St, Philadelphia, Pa.
Pennwell Oil & Belting Co, 5 White St, New York, N. Y.
Raniville, F, Co, Grand Rapids, Mich.
Safety Belt Lacer Co, Toledo, Ohio
Schieren, Chas A, Co, 30-39 Ferry St, New York, N. Y.
Schwartz Belting Co, 74 Murray St, New York, N. Y.
Talcott, W O & M W, Inc, Providence, R. I.

LARRIES

(See Also Scales)

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Richardson Scale Co, 690 Van Houten Ave, Clifton, N. J.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio.
Beaumont-Birch Co, 1505 Race St, Philadelphia, Pa.
Bergen Point Iron Works, Bayonne, N. J.
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Caldwell, W E, Co, 280 Brandeis St, Louisville, Ky.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Columbus Conveyor Co, Columbus, Ohio
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Heilman Boiler Works, Allentown, Pa.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio.
Webster Mfg Co, Tiffin, Ohio
Wellman Engrg Co, 7000 Central Ave, Cleveland, Ohio

LEATHER PACKING

(See Packing, Leather)

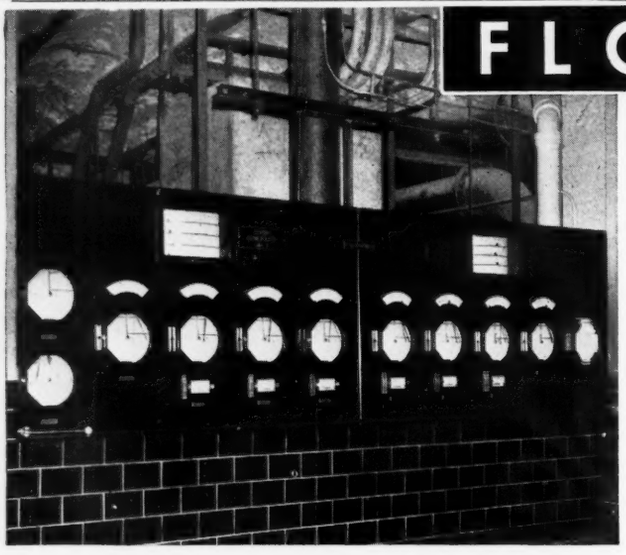
LEATHERS, HYDRAULIC

Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Rhoads, J E, & Sons, 35 N 6 St, Philadelphia, Pa.
Eagle Belting & Leather Co, 1405 Central Pkwy, Cincinnati, O.
Graton & Knight Co, Worcester, Mass.
Himmelein & Bailey, Inc, Camden, N. J.
Houghton, E F, & Co, 244-50 W Somerset St, Phila, Pa.
Page Belting Co, Concord, N. H.
Preston, Horace G, Co, Detroit
Raniville, F, Co, Grand Rapids, Mich.
Robertson, John, Co, Inc, 71 Water St, Brooklyn, N. Y.
Schieren, Chas A, Co, 30-39 Ferry St, New York, N. Y.

LUBRICATORS

Gardner-Denver Co, Quincy, Ill.
Hunter Pressed Steel Co, 8000 Maple Ave, Lansdale, Pa.
Jarecki Mfg Co, Erie, Pa.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, O.
Manzell Bros Co, 326 Babcock St, Buffalo, N. Y
Powell, Wm, Co, Cincinnati, O.
Trico Fuse Mfg Co, 2955 N 5th St, Milwaukee, Wis.
Atlas Elevator Devices Co, 101 W 31st St, New York, N. Y.
Bowser, S F, & Co, 1302 E Creighton Ave, Fort Wayne, Ind.
Detroit Lubricator Co, Trumbull Ave, Detroit, Mich.
Lincoln Engrg Co, 5701 Natural Bridge, St Louis, Mo.
Logansport Machine, Inc, 914 Cotner Rd, Logansport, Ind.
McCullough Mfg Co, 2636 Central Ave, N E, Minneapolis, Minn.

FLOW METERS



For Measuring the Flow of Steam-Water-Gas-Air-Oil

Do you have a means for easily and quickly checking the production and distribution of these power plant services? Do you know how much you are paying for steam or how economically it is being used? Republic flow meters will give you all the production and maintenance information you need in order to detect leaks and improve methods.

WORKING PRESSURES
Republic meters are available for all working pressures up to 5000 lb. per sq. in.

RANGE EASILY CHANGED
The range of a Republic meter can be easily and quickly changed by merely changing the range tube.

READING INSTRUMENTS
The Republic indicator, recorder and integrator operate independently of each other and can be supplied separately or in combination. They are remote reading.

EASILY READ
The indicator scale and the recorder chart all have uniform graduations and are direct reading. The integrator has a large cyclometer type dial.

TYPICAL INSTALLATIONS

ELI LILLY & CO.
MASONITE CORP.
THE VISCOSE CO.
STANDARD OIL CO.
QUAKER OATS CO.
MORTON SALT CO.
WESTERN ELECTRIC CO.
SHERWIN WILLIAMS CO.
WHEELING STEEL CORP.
CONSOLIDATED GAS CO.
CHEVROLET MOTORS CO.
ANHEUSER-BUSCH CO.

FOR COMPLETE DETAILS WRITE FOR DATA BOOK No. 701

REPUBLIC FLOW METERS CO. 2222 DIVERSEY PKWY. CHICAGO, ILLINOIS

Nathan Mfg Co, 250 Park Ave, New York, N. Y.
Norgren, C A, Co, 210 Santa Fe Drive, Denver, Colo.
Nugent, Wm W, & Co, Inc, 402 N Hermitage Ave, Chicago, Ill.
Ohio Grease Co, Loudonville, O.
Ohio Injector Co, 150 Ohio Ave, Wadsworth, Ohio
Stewart Warner Corp, 1826-1852 Diversey Pkwy, Chicago, Ill.
Torrington Mfg Co, Torrington, Conn.
U. S. Metallic Packing Co, Hamilton St, Philadelphia, Pa.
Williams, D T, Valve Co, 2854 Spring Grove Ave, Cincinnati, O.

MEGOHMMETERS

Biddle, Jas G, Co, 1211-13 Arch St, Philadelphia, Pa.
Esterline-Angus Co, Box 596, Indianapolis, Ind.

METALLIC PACKING

(See Packing, Metallic)

METAL-SPRAY EQUIPMENT

(See Guns, Metal-Spray)

METERS, AIR

Bailey Meter Co, Inc, 1036 Ivanhoe Rd, Cleveland, Ohio.
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Foxboro Co, 38 Neponset Ave., Foxboro, Mass.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Simplex Valve & Meter Co, 6780 Upland St, Philadelphia, Pa.
American Meter Co, Inc, 60 E 42nd St, New York, N. Y.
Bacharach Industrial Inst Co, 7000 Bennett, Pittsburgh, Pa.
Bristol Co, Waterbury, Conn.
Clark, Chas J. Blast Meter Co, Gladbrook, Iowa.
Fischer & Porter Co, 61 W Penn St, Germantown, Phila, Pa.
Friez, Julien P, & Sons, 4 N Central Ave, Baltimore, Md.
Roots-Connersville Blower Corp, Connersville, Ind.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.

METERS, COAL

Bailey Meter Co, 1036 Ivanhoe Road, Cleveland, Ohio
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.

METERS, CO_2

(See Gas Analyzers)

METERS, FLOW

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Bailey Meter Co, 1036 Ivanhoe Road, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave., Philadelphia, Pa.
Builders Iron Foundry, 7 Codding St, Providence, R. I.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Henszey Co, Dept D-14, Watertown, Wis.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Simplex Valve & Meter Co, 6780 Upland St, Philadelphia, Pa.
Taylor Instrument Cos, Rochester, N. Y.
American Meter Co, Inc, 60 E 42nd St., New York, N. Y.
Bacharach Industrial Inst Co, 7000 Bennett, Pittsburgh, Pa.
Bristol Co, Waterbury, Conn.
Buffalo Meter Co, 2887 Main St, Buffalo, N. Y.
Fischer & Porter Co, 61 W Penn St, Germantown, Phila, Pa.

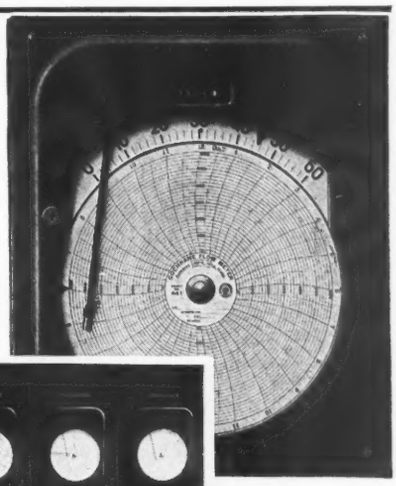
COCHRANE FLOW METERS

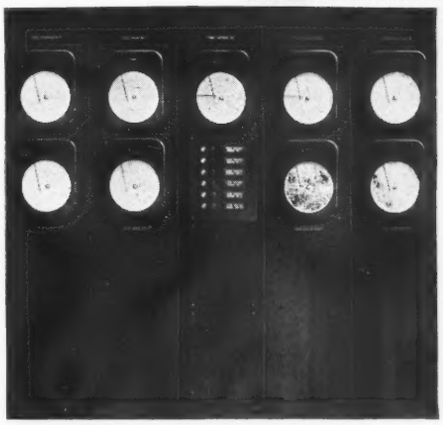
•

for every type of metering problem

•

For over 20 years Cochrane has been interested in the measurement of flow through pipelines





Cochrane Flow Meters are made in a variety of styles and combinations in both electrical and mechanical types to fill the exacting needs of those concerned in maintaining plant economies. Write for catalogs

COCHRANE CORPORATION 3106 N. 17th St., Philadelphia, Pa.

COCHRANE

METERS, FLOW

VENTURI METERS—For boiler feed, and other main line services requiring super-accuracy of measurement over unusually wide measuring range, Builders Type M Venturi Register-Indicator-Recorders (Fig. 1.) have been standard equipment for many years. Known for their simplicity, sturdy construction, and maintained reliability of performance. (Bulletin 315)

Fig. 1

FLO-WATCH METERS—These meters, Fig. 2, are simple, unusually accurate mechanical flow meters (electrical chart drive), designed for use with orifice plates. Particularly useful on secondary lines where a chart record of flow variations is of value for analyzing periods of peak demand. Totallizing model can be equipped for remote metering. (Bulletin 303)

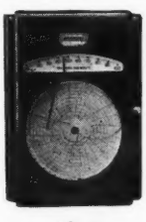


Fig. 2

SHUNT METERS for Steam, Air, or Gas—Use of Shunt Meters, economically installed on even the smallest lines, makes it possible to complete the study of means of reducing steam or air consumed in various buildings, departments, machines, and processes. Easily installed, low-priced, accurate over wide range of flow. (Bulletin 307)

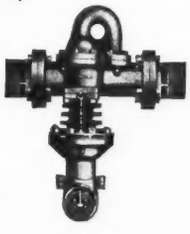
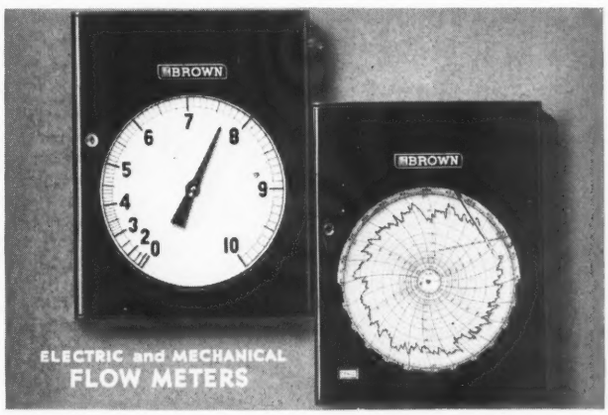


Fig. 3

BUILDERS IRON FOUNDRY
7 Codding Street Providence, R. I.



For Controlling, Recording, Totalizing and Indicating the Flow of Fluids such as Steam, Water, Gas, Oil, etc.

Brown Flow Meters are available in two types, the Electric type and Mechanical type.

ELECTRIC TYPE: Complete equipment consists of three units, the orifice plate, manometer and instrument. Instrument can be located at a remote point from the orifice and manometer (point of flow measurement).

Because of this flexibility, it is particularly adaptable for applications where instruments are to be remotely located for control purposes.

MECHANICAL TYPE: Complete equipment consists of two units, the orifice plate and the instrument. The meter body is integral with the instrument. Readings are transmitted mechanically from meter body to instrument.

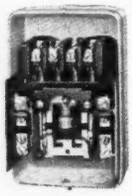
Write for Catalog 2006. THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4490 Wayne Avenue, Philadelphia, Pa.

BROWN FLOW METERS

To Measure and Control is to Economize

MOTOR STARTERS

Everything Electrical
GraybaR QUALITY
GraybaR ELECTRIC COMPANY



One Item of the Graybar 60,000.

We have readily available the right control apparatus for every power requirement.

DISTRIBUTED BY

GraybaR ELECTRIC COMPANY

IN 83 PRINCIPAL CITIES

YARWAY

INVOLUTE

SPRAY NOZZLES

Non-clog design. Sizes ¼" to 2½". For general recooling and air conditioning service. Low pressures, fine spray, efficient operation. Installations total more than four million gallons per minute. Catalogs N-613 and N-615.

See other Yarway Advertisements on pages 101 181, 204, and 209.

YARNALL-WARING CO.
100 Mermaid Ave., Phila.

EDCO SPRAY NOZZLES

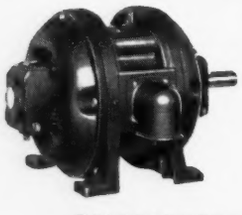
FOR OIL BURNERS & AIR CONDITIONING

Any industrial atomizing, cooling or washing that calls for spray nozzles can be done better with EDCOS. For there are types and materials to meet every requirement and *every* EDCO tip is carefully checked for spray angle, atomization and actual rated capacity . . . Furnished in Stainless Steel, Bronze, Nitralloy, Monel, Stoneware and Hard Rubber . . . Write today for illustrated Bulletin 3C1.

EDDINGTON METAL SPECIALTY CO.
EDDINGTON, PENNSYLVANIA

MOTORS

Everything Electrical
GraybaR QUALITY
GraybaR ELECTRIC COMPANY



One Item of the Graybar 60,000

General Purpose, Squirrel-Cage A.C. Slip-Ring and Repulsion D.C. Compound, Series, Shunt Fractional Horsepower Motors—all of G.E. manufacture and all conveniently available from Graybar.

DISTRIBUTED BY

GraybaR ELECTRIC COMPANY

IN 83 PRINCIPAL CITIES

International Filter Co, 325 W 25th Place, Chicago, Ill.
Morey & Jones, Ltd, Room 1010, 922 S Hemlock St, Los Angeles, Calif.
Roots-Connersville Blower Corp, Connersville, Ind.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Spray Engrg Co, 114 Central St., Somerville, Pa.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.

METERS, FREQUENCY

Biddle, Jas G, Co, 1211-13 Arch St, Philadelphia, Pa.
General Electric Co, Schenectady, N. Y.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Bristol Co, Waterbury, Conn.
Esterline-Angus Co, Box 596, Indianapolis, Ind.
Roller-Smith Co, 1766 W Market St., Bethlehem, Pa.

METERS, PH-CONCENTRATION

Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Bristol Co, Waterbury, Conn.

METERS, PITOT-TUBE

Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Bacharach Industrial Inst Co, 7000 Bennett, Pittsburgh, Pa.
Ellison-Draft Gage Co, 214 W Kinzie St, Chicago, Ill.
Friez, Julien P, & Sons, 4 N Central Ave., Baltimore, Md.
(See Bases, Motor)

MOTOR BASES, PIVOTED, TENSION

(See Bases, Motor)

MOTOR-GENERATORS

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Crocker-Wheeler Electric Mfg Co, Ampere, N. J.
Elliott Co, Jeannette, Pa.
Erie Electric Co, 124 Church St, Buffalo, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Reliance Electric & Engrg Co, 1068 Ivanhoe Rd, Cleveland, O.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Burke Electric Co, Erie, Pa.
Caterpillar Tractor Co, 1940 Walker Ave, Peoria, Ill.
Century Electric Co, 1806-12 Pine St, St Louis, Mo.
Diehl Mfg Co, Elizabethport, N. J.
Fairbanks, Morse & Co, 600 S Michigan Ave., Chicago, Ill.
Forbes & Myers, 174 Union St, Worcester, Mass.
Janette Mfg Co, 556 W Monroe St, Chicago, Ill.
Wesche, B A, Electric Co, Cincinnati, Ohio

MOTOR STARTERS, ELECTRIC AC & DC

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Cutler-Hammer, Inc, 606 N 12th St, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Monitor Controller Co, Lombard & Gay Sts, Baltimore, Md.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Allen-Bradley Co, Milwaukee, Wis.
Clark Controller Co, Cleveland, Ohio
Colt's Patent Fire Arms Mfg Co, Hartford, Conn.
Electric Controller & Mfg Co, Cleveland, Ohio
Rowan Controller Co, 2313 Homewood Ave, Baltimore, Md.
Square D Co, Rivard & Piquette Sts, Detroit, Mich.

MOTORS, ELECTRIC

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Columbia Electric Mfg Co, 451 Hamilton Ave, Cleveland, O.
Crocker-Wheeler Electric Mfg Co, Ampere, N. J.
Electric Machinery Mfg Co, 133 Tyler St N E, Minneapolis Minn.
Elliott Co, Jeannette, Pa.
Erie Electric Co, 124 Church St Buffalo, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Lincoln Electric Co, 12818 Coit Rd, Cleveland, Ohio
Reliance Electric & Engrg Co 1068 Ivanhoe Rd, Cleveland, O
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Allis, Louis, Co, Milwaukee, Wis.
Burke Electric Co, Erie, Pa.
Century Electric Co, 1086-12 Pine St, St Louis, Mo.
Continental Electric Co, 321 Ferry St, Newark, N. J.
Delco Products, Dayton, Ohio.
Diehl Mfg Co, Elizabethport, N. J.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Forbes & Myers, 174 Union St, Worcester, Mass.
Harnischfeger Corp, Milwaukee, Wis.
Howell Electric Motors Co, 671 Roosevelt St, Howell, Mich.
Ideal Electric & Mfg Co, Mansfield, Ohio
Imperial Electric Co, Akron, O.
Janette Mfg Co, 556 W Monroe St, Chicago, Ill.
Leland Electric Co, Dayton, O.
Master Electric Co, Dayton, O.
Onsrud Machine Works, Chicago, Ill.
Sterling Electric Motors, Inc, Los Angeles, Calif.
U. S. Elect Motors, Inc, 200 E Slauson Ave, Los Angeles, Cal.
Wagner Electric Corp, St Louis, Mo.

MUFFLERS, INTAKE & EXHAUST

Air-Maze Corp, 5120 Harvard Ave, Cleveland, Ohio
Burgess Battery Co, 500 W Huron St, Chicago, Ill.
Maxim Silencer Co, 85 Homestead Ave., Hartford, Conn
Staynew Filter Corp, Rochester, N. Y.
Engineer Specialties Co, 39 Cortland St, New York, N. Y.
Logansport Machine, Inc, 914 Cotner Rd, Logansport, Ind.

NOZZLES, SPRAY

American Blower Corp, 6000 Russell St, Detroit, Mich.
Buffalo Forge Co, 448 Broadway, Buffalo, N. Y.
Eddington Metal Specialty Co, Box K, Eddington, Pa.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kan.
National Airoil Burner Co, 1327 Girard Ave, Philadelphia, Pa.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.
Aldrich Pump Co, Allentown, Pa.
Bayley Blower Co, 1817 S 66th St, Milwaukee, Wis.
Binks Mfg Co, 3114-40 Carroll Ave, Chicago, Ill.
Burhorn, Edwin, Co, 1 Newark St, Hoboken, N. J.
Deister Concentrator Co, Ft Wayne, Ind.
Monarch Mfg Works, Inc, 2731 E Westmoreland, Phila, Pa.
Penn Cooling Tower Works, Pittsburgh, Pa.
Schubert-Christy Corp, 1600 Georgia St, Affton Station, St Louis, Mo.
Spray Engrg Co, 111 Central St, Sommerville, Mass.
Spraying Systems Co, 4021-C W Lake St, Chicago, Ill.
Supreme Electric Products Corp, 103 Mt Hope Ave, Rochester, N. Y.

ODOR ADSORBERS

(See Adsorbers, Odor)

OHMMETERS

Biddle, Jas G, Co, 1211-13 Arch St, Philadelphia, Pa.

General Electric Co, Schenectady, N. Y.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Esterline-Angus Co, Box 596, Indianapolis, Ind.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.

OIL-BURNING SYSTEMS, INDUSTRIAL

(See Also Burners, Oil

Best, W N, Engrg Co, 110 Washington St, New York, N. Y.
Engineer Co, 17 Battery Place, New York, N. Y.
National Airoil Burner Co, 1327 Girard Ave, Philadelphia, Pa.
Todd Combustion Equipment, 601 W 26th St, New York, N. Y.
Anthony Co, 47-33 5th St, Long Island City, N. Y.
Flinn & Dreffein Co, W Washington Blvd, Chicago, Ill.
Hadley, F V, Co, 127 Federal St, Boston, Mass.
Hauck Mfg Co, 126 10th St, Brooklyn, N. Y.
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.
Petroleum Heat & Power Co, Stamford, Conn.
Ray Oil Burner Co, 411 Bernal St, San Francisco, Calif.
Schutte & Koerting Co, 12th & Thompson, Phila, Pa.
Simplex Oil Heating Corp, Room 3004, 21 West St, New York, N. Y.
Tate-Jones & Co, 23 Broad St, Leetsdale, Pa.

OIL RECLAIMERS

(See Purifiers, Oil)

OIL STRAINERS

(See Strainers, Oil)

OILING SYSTEMS, LUBRICATION

Trico Fuse Mfg Co, 2955 No 5th St, Milwaukee, Wis.
Manzel Bros Co, 326 Babcock St, Buffalo, N. Y.
Bowser, S F, & Co, 1302 Creighton Ave, Fort Wayne, Ind.
Nugent, Wm W, & Co, Inc, 402 N Hermitage Ave, Chicago, Ill.
Stewart Warner Corp, 1826-1852 Diversey Pkwy, Chicago, Ill.

OILS, FUEL

Cities Service Oil Co, 60 Wall Tower, New York, N. Y.
Gulf Oil Corp, Gulf Bldg, Pittsburgh, Pa.
Pure Oil Co, Chicago, Ill.
Shell Oil Co, 50 W 50th St, New York, N. Y.
Socony-Vacuum Oil Co, Inc, 26 Broadway, New York, N. Y.
Standard Oil Co, Ind., 910 S Michigan Ave, Chicago, Ill.
Texas Co, 135 E 42nd St, New York, N. Y.
Tidewater Assoc Oil Co, 17 Battery Place, New York, N. Y.
Arkansas Fuel Oil Co, Shreveport, La.
Pennzoil Co, Oil City, Pa.
Petroleum Heat & Power Co, Stamford, Conn.
Sinclair Refining Co, 630 5th Ave, New York, N. Y.
Standard Oil Co, N. J., 26 Broadway, New York, N. Y.
Sun Oil Co, Philadelphia, Pa.
Valvoline Oil Co, Cincinnati, Ohio.

OILS, LUBRICATING

Cities Service Oil Co, 60 Wall Tower, New York, N. Y.
Gulf Oil Corp, Gulf Bldg, Pittsburgh, Pa.
Lion Oil Refining Co, El Dorado, Ark.
Macmillan Petroleum Corp, 530 W 6th St, Los Angeles, Calif.
Pure Oil Co, Chicago, Ill.
Shell Oil Co, 50 W 50th St, New York, N. Y.
Socony-Vacuum Oil Co, Inc, 26 Broadway, New York, N. Y.
Standard Oil Co, Calif., 225 Bush St, San Francisco, Calif.
Standard Oil Co, Ind., 910 S Michigan Ave, Chicago, Ill.
Texas Co, 135 E 42nd St, New York, N. Y.
Tidewater Assoc Oil Co, 17 Battery Pl, New York, N. Y.
Acheson Colloids Corp, Port Huron, Mich.
Chard & Howe, 88 Van Dyke St, Brooklyn, N. Y.
Fiske Bros Refining Co, 129 Lockwood St, Newark, N. J.
Galena Oil Corp, Cincinnati, O.
Harris, A W, Oil Co, Providence, R. I.
Houghton, E F, & Co, 244-50 W Somerset St, Phila, Pa.
Ilsley, Doubleday, & Co, 56-14 Nurge Ave, Maspeth, N. Y.
Kellogg, E H, & Co, 93 Water St, New York, N. Y.
Keystone Lubricating Co, 21st & Clearfield, Phila, Pa.
Ohio Grease Co, Loudonville, O.
Pennzoil Co, Oil City, Pa.
Sinclair Refining Co, 630 5th Ave, New York, N. Y.
Sonneborn, L, Sons, Inc, 88 Lexington Ave, New York, N. Y.
Standard Oil Co, N. J., 26 Broadway, New York, N. Y.
Stewart Warner Corp, 1826-1852 Diversey Pkwy, Chicago, Ill.
Sun Oil Co, Philadelphia, Pa.
Swan-Finch Oil Corp, RCA Bldg, W, New York, N. Y.
Valvoline Oil Co, Cincinnati, O.

OILS, TRANSFORMER & SWITCH

Cities Service Oil Co, 60 Wall Tower, New York, N. Y.
Tidewater Assoc Oil Co, 17 Battery Place, New York, N. Y.
Kellogg, E H & Co, 659 Water St, New York, N. Y.
Sun Oil Co, Philadelphia, Pa.

OPERATORS, MOTOR-VALVE

(See Valve Operators, Motor)

PACKING, ASBESTOS

Belmont Packing & Rubber Co, East Butler & Sepviva Sts, Philadelphia, Pa.
Carey, Philip, Co, Lockland, O.
Eureka Packing Co, 294–296 46th St, Brooklyn, N. Y.
France Packing Co, 6510 Tacony St, Tacony, Philadelphia, Pa.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packet Co, 10 Allen Ave, New Brunswick, N. J.
Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Greene, Tweed & Co, Room 805, 101 Park Ave, New York, N. Y.
Jenkins Bros, 81 White St, New York, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
Sea-Ro Packing Co, 73 West St, New York, N. Y.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, Norwood, Cincinnati, Ohio
Crandall Packing Co, Palmyra, N. Y.
Darcoid Co, Inc, 200 Varick St, New York, N. Y.
Durabla Mfg Co, Room, 202, 114 Liberty St, New York, N. Y.
Ehret Magnesia Mfg Co, Inc, Valley Forge, Pa.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Klingerit, Inc, 16 Hudson St, New York, N. Y.
Linear Packing & Rubber Co, State Rd & Levick St, Phila, Pa.
Savage Packing & Engrg Co, 1029 Clinton St, Hoboken, N. J.
Thermoid Co, Whitehead Rd, Trenton, N. J.
Union Asbestos & Rubber Co, 1821 S 54th Ave, Cicero, Ill.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.
Vellumoid Co, 54 Rockdale St, Worcester, Mass.
Walker, James, Packing Co, 98 Liberty St, New York, N. Y.

PACKING, FELT

American Felt Co, 315 4th Ave, New York, N. Y.
Booth Felt Co, 463 19th St, Brooklyn, N. Y.
Felters Co, Inc, Dept LM, 210 South St, Boston, Mass.
Western Felt Works, Ogden Ave, Chicago, Ill.

PACKING, FIBRE

Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Greene, Tweed & Co, Room 805, 101 Park Ave, New York, N. Y.
Allpax Co, Mamaroneck, N. Y.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, Norwood, Cincinnati, Ohio
Vellumoid Co, 54 Rockdale St, Worcester, Mass.

PACKING, FLAX

Belmont Packing & Rubber Co, E Butler & Sepviva Sts, Philadelphia, Pa.
Eureka Packing Co, 294–296 46th St, Brooklyn, N. Y.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packing Co, 10 Allen Ave, New Brunswick, N. J.
Greene, Tweed & Co, Room 805, 101 Park Ave, New York, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Darcoid Co, Inc, 200 Varick St, New York, N. Y.
Linear Packing & Rubber Co, State Rd & Levick St, Phila, Pa.
Savage Packing & Engrg Co, 1029 Clinton St, Hoboken, N. J.
Union Asbestos & Rubber Co, 1821 So 54th Ave, Cicero, Ill.
Walker, James, Packing Co, 98 Liberty St, New York, N. Y.

PACKING, HEMP, JUTE

Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packing Co, 10 Allen Ave, New Brunswick, N. J.
Johns-Manville, 22 E 40th St, New York, N. Y.

PACKING, HYDRAULIC

Belmont Packing & Rubber Co, E Butler & Sepviva Sts, Philadelphia, Pa.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packing Co, 10 Allen Ave, New Brunswick, N. J.
Greene, Tweed & Co, Room 805, 101 Park Ave, New York, N. Y.
Jenkins Bros, 81 White St, New York, N. Y.
Marlo Co, 60 Grand St, New York, N. Y.
Sea-Ro Packing Co, 73 West St, New York, N. Y.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, Norwood, Cincinnati, Ohio
Darcoid Co, Inc, 200 Varick St, New York, N. Y.
Federal Metallic Packing Co, 295 Foundry St, Wakefield, Mass.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Houghton, E F & Co, 244-50 W Somerset St, Phila, Pa.
Mabbs Hydraulic Packing Co, Manhattan Bldg, Chicago, Ill.
Quaker City Rubber Co, Comly & Milnor Sts, Philadelphia, Pa.
Walker, James, Packing Co, 98 Liberty St, New York, N. Y.

PACKING, LEATHER

Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Rhoads & Sons, J E, 35 N Sixth St, Philadelphia, Pa.

GARLOCK
The Standard Packing of the World
Mechanical Packings . . . Gaskets . . . Klozure Oil Seals . . . Molded Rubber and Asbestos Goods.
TRADE GARLOCK MARK
1 2 3 4 5
THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Limited, Montreal, Que.

PATENTED
"EUREKA"
TRADE MARK

PACKINGS
FOR ALL PURPOSES

You can be assured of the highest quality in materials produced by trained mechanics in the packing industry when you use "EUREKA" PACKING—and you can be certain that for whatever purpose used, "EUREKA" will do your packing job better, more efficiently and more economically.

AMBEST—*the Universal Packing*

In spiral form — sizes ⅛ to 2" inclusive

In loose strand form — for any size rod or box

In ring form — available in any size

. . . for longer service

Ambest is the packing that's good till the last stroke on any good rod—universal for reciprocating or centrifugal rods—good for all pressures and temperatures up to 550° F. Try it on engines, pumps, compressors, throttle and steam valves, condensers and other similar applications. See how it protects as it packs—how easy it is to apply and how it will cut your packing costs. Available in loose strand, spiral, and ring form.

OTHER EUREKA BRANDS

Genuine Eureka Oval Gum Core—a rod packing that cannot be excelled for long service—in sizes from ¼" to 2".

Square 100% Flax—for all types of plungers pumping water, elevator plungers, deep well pumps—in sizes from ¼" to 2".

Waterproof Hydraulic 100% Flax—for all types of heavy hydraulic work—including pumping gritty water, brine, cold oil, accumulators—sizes from ¼ to 2"—coil, spiral, and ring types.

Low and Intermediate Pressure Steam—for service on rods and plungers against hot and cold water and steam up to 100 lbs.—all sizes from ⅛" to 1½".

Blue 100% Asbestos Acid Packing—for use on centrifugal pumps handling strong acid or alkaline conditions. The blue 100% asbestos will stand this condition better than any other fiber.

High Pressure Asbestos Steam—for packing reciprocating or oscillating rods and plungers against steam or air at high speed up to 600° F. Sizes ¼" to 1½"—Spiral, Coil and Ring form.

Square Plated Asbestos—for service on centrifugal or rotary shafts handling hot or cold water—sizes ¼" to 1½". Spiral, Coil and Ring Form.

The Eureka offers 35 popular brands of packing, as well as a complete line of sheet packing and metallic packing in coil and spiral forms.

If You Use Packing of Any Kind, You Need This

NEW 36 Page Catalog

SENT FREE ON REQUEST

Containing valuable information on all types of packing for all types of service including helpful data on cutting and installing packing. Send for your copy TODAY.

EUREKA PACKING COMPANY
294-296 46th Street Brooklyn, N. Y.

Watson-Stillman Co, Roselle, N. J.
Alexander Bros, 410 N 3rd St, Philadelphia, Pa.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Eagle Belting & Leather Co, 1405 Central Pkwy, Cincinnati, O.
Graton & Knight, Worcester, Mass.
Houghton, E F, & Co, 244-50 W Somerset St, Phila, Pa.
Mabbs Hydraulic Packing Co, Manhattan Bldg, Chicago, Ill.
Philadelphia Belting Co, 6th & Spring Garden Sts, Philadelphia, Pa.
Schieren, Chas A, Co, 30-39 Ferry St, New York, N. Y.

PACKING, METALLIC

Belmont Packing & Rubber Co, E Butler & Sepviva Sts, Philadelphia, Pa.
Cook, C Lee, Mfg Co, 916 S 8th St, Louisville, Ky.
Eureka Packing Co, 294–296 46th St, Brooklyn, N. Y.
France Packing Co, 6510 Tacony St, Tacony, Philadelphia, Pa.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packing Co, 10 Allen Ave, New Brunswick, N. J.
Johns-Manville, 22 E 40th St, New York, N. Y.
Marlo Co, 60 Grand St, New York, N. Y.
National Engrg Products, Inc, Commerce & Savings Bldg, Washington, D. C.
Tripp Metallic Packing Co, Washington St, Boston, Mass.
Conneaut Packing Co, 200 Main St, Conneaut, Ohio
Crandall Packing Co, Palmyra, N. Y.
Durametallic Corp, Kalamazoo, Mich.
Ehret Magnesia Mfg Co, Inc, Valley Forge, Pa.
Holmes Metallic Packing Co, 45 Westminster, Wilkes - Barre, Pa.
Huhn Mfg Co, 1395 Sedgwick Ave, New York, N. Y.
Mellor Packing Mfg Co, 332 Ocean Ave, Jersey City, N. J.
Metalastic Mfg Corp, 566 Broad St, Glen Rock, N. J.
Rains Wood-Metal Packings, Spokane, Wash.
Rodpak Mfg Co, 1161 Folsom St, San Francisco, Calif.
Savage Packing & Engrg Co, 1029 Clinton St, Hoboken, N. J.

PACKING, RUBBER

Belmont Packing & Rubber Co, E Butler & Sepviva Sts, Phila, Pa.
Eureka Packing Co, 294–296 46th St, Brooklyn, N. Y.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packing Co, 10 Allen Ave, New Brunswick, N. J.
Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Jenkins Bros, 81 White St, New York, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Chesterton, A W, Co, 64 India St, Boston, Mass.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, Norwood, Cincinnati, Ohio
Darcoid Co, Inc, 200 Varick St, New York, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Linear Packing & Rubber Co, State Rd & Levick St, Phila, Pa.
Quaker City Rubber Co, Comly & Milnor Sts, Philadelphia, Pa.
Thermoid Co, Whitehead Rd, Trenton, N. J.
Union Asbestos & Rubber Co, 1821 So 54th Ave, Cicero, Ill.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.
Walker, James, Packing Co, 98 Liberty St, New York, N. Y.

PACKING, SEMI-METALLIC

Belmont Packing & Rubber Co, E Butler & Sepviva Sts, Phila, Pa.
France Packing Co, 6510 Tacony St, Tacony, Philadelphia, Pa.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Marlo Co, 60 Grand St, New York, N. Y.
Sea-Ro Packing Co, 73 West St, New York, N. Y.

Save this Issue!

It is a reference book for all of 1940. You will have occasion to use it again and again.

File It Handy to Your Working Desk

nchor Packing Co, 401 N Broad St, Philadelphia, Pa.
arcoid Co, Inc, 200 Varick St, New York, N. Y.
urametallic Corp, Kalamazoo, Mich.
ederal Metallic Packing Co, 295 Foundry St, Wakefield, Mass.
inear Packing & Rubber Co, State Rd & Levick St, Phila, Pa.
letalastic Mfg Corp, 566 Broad St, Glen Rock, N. J.
Union Asbestos & Rubber Co, 1821 So 54th Ave, Cicero, Ill.
Walker, James, Packing Co, 98 Liberty St, New York, N. Y.

PACKING, SHEET

Belmont Packing & Rubber Co, E Butler & Sepviva Sts, Phila, Pa.
Eureka Packing Co, 294–296 46th St, Brooklyn, N. Y.
Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Goetze Gasket & Packing Co, 10 Allen Ave, New Brunswick, N. J.
Goodyear Tire & Rubber Co, 1144 E Market St, Akron, Ohio
Greene, Tweed & Co, Room 805, 101 Park Ave, New York, N. Y.
Jenkins Bros, 81 White St, New York, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
Sea-Ro Packing Co, 73 West St, New York, N. Y.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Chicago Wilcox Mfg Co, 7701 Avalon Ave, Chicago, Ill.
Cincinnati Rubber Mfg Co, 4901 Franklin Ave, Norwood, Cincinnati, Ohio
Crandall Packing Co, Palmyra, N. Y.
Darcoid Co, Inc, 200 Varick St, New York, N. Y.
Durabla Mfg Co, Room 202, 114 Liberty St, New York, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Klingerit, Inc, 16 Hudson St, New York, N. Y.
Linear Packing & Rubber Co, State Rd & Levick St, Phila, Pa.
Quaker City Rubber Co, Comly & Milnor Sts, Phila, Pa.
Savage Packing & Engrg Co, 1029 Clinton St, Hoboken, N. J.
Thermoid Co, Whitehead Rd, Trenton, N. J.
U. S. Rubber Co, 1792 Broadway, New York, N. Y.
Vellumoid Co, 54 Rockdale St, Worcester, Mass.
Walker, James, Packing Co, 98 Liberty St, New York, N. Y.

PAINT, ALUMINUM

Dixon, Joseph, Crucible Co, 170 Wayne St, Jersey City, N. J.
Thurmalox Co, 3109 N Broad St, Philadelphia, Pa.
Aluminum Industries, Inc, 2416-38 Beekman St, Cincinnati, O.
American Asphalt Paint Co, 43 E Ohio St, Chicago, Ill.
Sherwin-Williams Co, Prospect Ave, Cleveland, Ohio
Skybryte Co, Cleveland, Ohio
Wailes Dove-Hermiston Corp, 17 Battery Place, New York, N. Y.
White Co, 3200 E Biddle St, Baltimore, Md.

PAINT, ASPHALT-BASE

Carey, Philip Co, Lockland, O.
American Asphalt Paint Co, 43 E Ohio St, Chicago, Ill.
Flintkote Co, 50 W 50th St, New York, N. Y.
Wailes Dove-Hermiston Corp, 17 Battery Place, New York, N. Y.

PAINT, BOILER-DRUM

(See Coatings, Boiler-Drum & Tubes)

PAINT, HEAT-RESISTANT

Dixon, Joseph, Crucible Co, 170 Wayne St, Jersey City, N. J.
Aluminum Industries Inc, 2416-38 Beekman St, Cincinnati, O.
American Asphalt Paint Co, E Ohio St, Chicago, Ill.
Arco Co, Cleveland, Ohio
Barrett Co, 40 Rector St, New York, N. Y.
Cheesman-Elliot Co, 647 Kent Ave, Brooklyn, N. Y.
Quigley Co, Inc, 56 W 45th St, New York, N. Y.
Tropical Paint & Oil Co, Cleveland, Ohio
Wailes Dove-Hermiston Corp, 17 Battery Place, New York, N. Y.
White Co, 3200 E Biddle St, Baltimore, Md.

PAINT, INDUSTRIAL

Dampney Co of America, 1243 River St, Hyde Park, Mass.
Dixon, Joseph, Crucible Co, 170 Wayne St, Jersey City, N. J.
American Asphalt Paint Co, 43 E Ohio St, Chicago, Ill.
Arco Co, Cleveland, Ohio
Barrett Co, 40 Rector St, New York, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Keystone Varnish Co, 71 Otsego St, Brooklyn, N. Y.
Koppers Co, Pittsburgh, Pa.
Quigley Co, Inc, 56 W 45th St, New York, N. Y.
Sherwin-Williams Co, Cleveland, Ohio
Tropical Paint & Oil Co, Cleveland, Ohio
Wailes Dove-Hermiston Corp, 17 Battery Place, New York, N. Y.
White Co, 3200 E Biddle St. Baltimore, Md.

PAINT-SPRAY EQUIPMENT

Simons Paint Spray Brush Co, 9 Maryland Ave, Dayton, Ohio
Spray Engrg Co, 111 Central St, Somerville, Mass.

PIPE, ACID-, ABRASION-RESISTANT

Johns-Manville, 22 E 40th St, New York, N. Y.
Keasbey & Mattison Co, Butler Pike, Ambler, Pa.
Duriron Co, Inc, Dayton, Ohio
National Lead Co, 111 Broadway, New York, N. Y.
Pfaudler Co, Rochester, N. Y.
U. S. Stoneware Co, Akron, O.

PIPE, BRASS AND COPPER

American Brass Co, Waterbury, Conn.
Chase Brass & Copper Co, Waterbury, Conn.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Scovill Mfg Co, Waterbury, Conn.
Mueller Brass Co, 1925 A Lapeer Ave, Port Huron, Mich.
Phelps Dodge Copper Products Corp, 40 Wall St, New York, N. Y.
Revere Copper & Brass Inc, Rome, N. Y.
Wolverine Tube Co, Central Ave, Detroit, Mich.

PIPE, CAST-IRON

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Walworth Co, Inc, 60 E 42nd St, New York, N. Y.
American Cast Iron Pipe Co, Birmingham, Ala.
Barco Mfg Co, 1802½ Winnemac Ave, Chicago, Ill.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
U. S. Pipe & Foundry Co, Burlington, N. J.
Warren Foundry & Pipe Corp, 11 Broadway, New York, N. Y.
Wood, R D, & Co, Chestnut St, Philadelphia, Pa.

PIPE CLAMPS

(See Clamps, Pipe)

PIPE, HARD-RUBBER

American Hard Rubber Co, 11 Mercer St, New York, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
U. S. Rubber Co, 1792 Broadway, New York, N. Y.

PIPE-JOINT COMPOUND

(See Compound, Pipe-Joint)

PIPE, SPIRAL-RIVETED, WELDED

Connery Construction Co, 2nd & Luzerne Sts, Phila, Pa.
Graver Tank & Mfg Co, Inc, East Chicago, Ind.
Midwest Piping & Supply Co, 1450 S 2nd St, St Louis, Mo.
Taylor Forge & Pipe Works, Box 485, Chicago, Ill.
American Rolling Mill Co, 7000 Curtis St, Middletown, Ohio
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, O.
Treadwell Construction Co, Midland, Pa.
Young & Bertke Co, 1040 W Hulbert Ave, Cincinnati, Ohio

PIPE, STEEL

Byers, A M, Co, Pittsburgh, Pa.
Chicago Bridge & Iron Co, 2454 Old Colony Bldg, Chicago, Ill.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Globe Steel Tubes Co, 4051 W Burnham St, Milwaukee, Wis.
Shaw, Benjamin F, Co, 509 E 2nd St, Wilmington, Del.
Steel & Tubes Div, 218 E 131st St, Cleveland, Ohio
Taylor Forge & Pipe Works, Box 485, Chicago, Ill.
Youngstown Sheet & Tube Co, Youngstown, Ohio
Bethlehem Steel Co, Bethlehem, Pa.
Duriron Co, Inc, Dayton, Ohio
Petroleum Iron Works, Sharon, Pa.
Pittsburgh Des Moines Steel Co, Neville Island, Pittsburgh, Pa.
Republic Steel Corp, Cleveland, Ohio
South Chester Tube Co, Chester, Pa.
Wheeling Steel Corp, Wheeling, W. Va.
Willamette Iron & Steel Corp, Portland, Ore.

PIPE, WOOD

National Tank & Pipe Co, Portland, Ore.
Pacific Tank & Pipe Co, Oakland, Calif.
Wyckoff Pipe & Creosoting Co, 522 Fifth Ave, New York, N. Y.

PIPE, WROUGHT-IRON

Byers, A M, Co, Pittsburgh, Pa.
Shaw, Benjamin F, Co, 509 E 2nd St, Wilmington, Del.
Taylor Forge & Pipe Works, Box 485, Chicago, Ill.
Bethlehem Steel Co, Bethlehem, Pa.
Cohoes Rolling Mills, Cohoes, N. Y.
Cook, A D, Inc, Lawrenceberg, Ind.
South Chester Tube Co, South Chester, Pa.

PIPE-BENDING MACHINES

Watson-Stillman Co, Roselle, N. J.
American Pipe Bending Machine Co, 37 Pearl St, Boston, Mass.

PIPE-THREADING MACHINES

(See Cutting & Threading Machines)

PIPING SYSTEMS, FABRICATED, WELDED

Grinnell Co, Inc, 277 W Exchange St, Providence, R. I.
Kellogg, M W, Co, Jersey City, N. J.
Midwest Piping & Supply Co, 1450 S 2nd St, St Louis, Mo.
National Valve & Mfg Co, 3102 Liberty Ave, Pittsburgh, Pa.

America's Truly Flexible Metallic Packings

MARLO Metallic packing

Red Water Packing Semi metallic

TWIN-TWIST Semi-metallic packing

THE MARLO CO.

60 GRAND ST. NEW YORK

PLUGS for QUICK REPAIRS of LEAKY BOILER TUBES

Installation of these boiler tube plugs consists of inserting the plug and tightening one nut. One type is designed to seal off both ends of a fire tube, an operation possible under pressure and without disturbing the back connections of the boiler. Another type (illustrated) is used to seal each end of a fire tube where access to the back tube sheet is convenient or when a leak is encountered between the tube and the tube sheet. The third type is intended for use in water tube boilers to eliminate lengthy shutdown. Plugs can be left in the boiler until convenient to install a new tube, and they may be used repeatedly after renewing the asbestos packing ring.

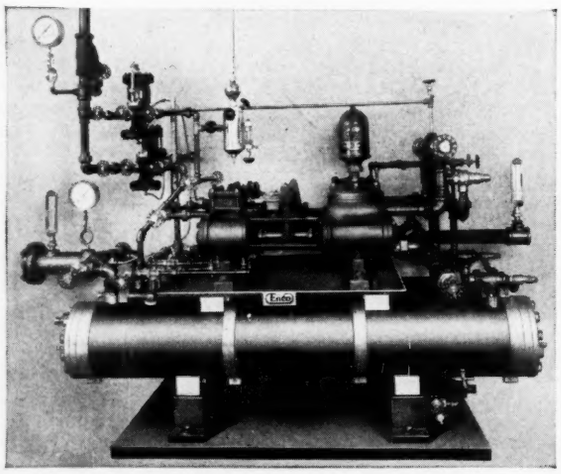
Write for literature and more information.

Hardie Made-Rite Boiler Tube Plug Co.

1742 SECOND AVE. NEW YORK, N. Y.

ENCO

FUEL OIL PUMPING AND HEATING SYSTEMS



A DUPLEX STEAM DRIVEN SYSTEM for 10 gallons of heavy fuel oil per minute or approx. 2,500 boiler horsepower.

CAPACITIES

from 100 to 5000 gallons per hour

Pumping units are designed for heavy bunker oil or light furnace oil.

The pump may be either the steam driven duplex or the rotary or screw type driven by motor or turbine.

Heaters are of the steel shell straight tube type, insulated and jacketed with planished steel.

Fully automatic control of oil pressure and temperature with relief valves for each pump and heater.—This permits the delivery of the oil with safety and at the proper temperature and pressure for efficient burning.

Complete piping so arranged that operation is obtained with any combination of pumps and heaters. Any part can be cut out of operation for inspection or cleaning.

Each unit is delivered completely built and ready to place on foundation and for connection to the station piping.

Write for Bulletin PB-37 describing Enco Oil Burning, Pumping and Heating Equipment.

THE ENGINEER COMPANY

17 Battery Place, New York, N. Y.

Pittsburgh Piping & Equipment Co, 121 43rd St, Pittsburgh, Pa.
Power Piping Div, Blaw-Knox Co, 1525 Pennsylvania Ave, Pittsburgh, Pa.
Shaw, Benjamin F, Co, 509 E 2nd St, Wilmington, Del.
Limbert, Geo, B, & Co, 570 Fulton St, Chicago, Ill.
Treadwell, M H, Co, 140 Cedar St, New York, N. Y.
Underground Steam Construction Co, 75 Pitts St, Boston, Mass.

PISTON RINGS

(See Rings, Piston)

PITOT TUBES

(See Tubes, Pitot)

PLANIMETERS

Bristol Co, Waterbury, Conn.
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
Robertson, Jas L, 3rd, 116 Broad St, New York, N. Y.
Trill Indicator Co, 38 E. South St, Corry, Pa.

PLATES, FLOOR

Alan Wood Steel Co, Conshohocken, Pa.
American Abrasive Metals Co, Irvington, N. J.
Burhorn, Edwin Co, 1 Newark St, Hoboken, N. J.
Carnegie-Illinois Steel Corp, Pittsburgh, Pa.
Central Iron & Steel Co, Harrisburgh, Pa.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
Irving Subway Grating Co, 50-09 27th, Long Island City, N. Y.
Lukens Steel Co, Coatesville, Pa.
Pittsburgh Valve & Fittings, Corp, Barberton, Ohio
Tri-Lok Co, Butler St, Pittsburgh, Pa.

PLUGS, TUBE, BOILER, CONDENSER

Hardie Made-Rite Boiler Tube Plug Co, 1245 Madison Ave, New York, N. Y.

PLUGS, FUSIBLE

Crane Co, 836 S Michigan Ave, Chicago, Ill.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, O.
Detroit Lubricator Co, Trumbull Ave, Detroit, Mich.
Nathan Mfg Co, 250 Park Ave, New York, N. Y.
Plouff Co, Columbus Ave, Boston, Mass.
Sherman, H B, Mfg Co, Battle Creek, Mich.
Standard Valve Mfg Co, Albany St, Boston, Mass.
Victoria Metal Co, Erie, Pa.

PNEUMATIC CONVEYORS

(See Conveying Systems, Pneumatic)

PORTABLE CONVEYORS

(See Conveyors, Portable)

PRECIPITATORS, DUST, ELECTROSTATIC

Research Corp, 405 Lexington Ave, New York, N. Y.
Western Precipitation Co, 1016 W 9th St, Los Angeles, Calif.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.

PREHEATERS, AIR

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Edge Moor Iron Works, Inc, 30 Rockefeller Plaza, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Keeler, E, Co, Williamsport, Pa.
Prat-Daniel Corp, 80 S Water St, Port Chester, N. Y.
Riley Stoker Corp, 999 Nepo set St, Worcester, Mass.
Sturtevant, B F, Co, 47 Rea ville St, Hyde Park, Bosto Mass.
Air Preheater Corp, 60 E 42 St, New York, N. Y.
Combustion Equipment Co, 1 Cherry St, Kansas City, M
Green Fuel Economizer Co, Main St, Beacon, N. Y.
Heilman Boiler Works, Alle town, Pa.
Schubert-Christy Corp, 16 Georgia St, Affton Station, Louis, Mo.
Surface Combustion Corp, T ledo, Ohio
Wickes Boiler Co, 512 N Wat St, Saginaw, Mich.

PSYCHROMETERS

Brown Instrument Co, 44 Wayne Ave, Philadelphi Pa.
Foxboro Co, 38 Neponset Av Foxboro, Mass.
Bristol Co, Waterbury, Conn.
Friez, Julien P, & Sons, 4 N Central Ave, Baltimore, Md.

PULLEYS, TRANSMISSION

Jones, W A, Foundry & Machine Co, 2434 W Roosevelt Rd, Chicago, Ill.
Reeves Pulley Co, Columbus, Ind.
American Pulley Co, Phila, Pa.
Ind.
Dodge Mfg Corp, Mishawaka, Ind.
Medart Co, 3548 DeKalb St, St. Louis, Mo.
Rockwood Mfg Co, 1801 English St, Indianapolis, Ind.
Wood's, T B, Sons Co, 1165 5th Ave, Chambersburg, Pa.

PULVERIZERS, COAL

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Erie City Iron Works, 1422 East Ave, Erie, Pa.
Hardinge Co, Inc, 240 Arch St, York, Pa.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Strong-Scott Mfg Co, N W Terminal, Minneapolis, Minn.
Whiting Corp, 15657 Lathrop Ave, Harvey, Ill.

PUMPING SYSTEMS, FUEL-OIL

Blackmer Pump Co, 2200 Century Ave, Grand Rapids, Mich.
Buffalo Pumps, Inc, 488 Broadway, Buffalo, N. Y.
De Laval Steam Turbine Co, Trenton, N. J.
Eddington Metal Specialties Co, Box K, Eddington, Pa.
Engineer Co, 17 Battery Place, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
National Airoil Burner Co, 1327 Girard Ave, Philadelphia, Pa.
Quimby Pump Co, Inc, 347 Thomas St, Newark, N. J.
Worthington Pump & Machinery Corp, Harrison, N. J.
American Marsh Pumps, 60 Capitol Ave, N E, Battle Creek, Mich.
Anthony Co, 47-33 5th St, Long Island City, N. Y.
Beach-Russ Co, 50 Church St, New York, N. Y.
Byron Jackson Co, Los Angeles, Calif.
Dean Brothers Co, Indianapolis, Ind.
Goulds Pumps, Inc, 301 Fall St, Seneca Falls, N. Y.
Granberg Equipment, Inc, 4068 Holden St, Oakland, Calif.
Kinney Mfg Co, Washington St, Boston, Mass.
Kraissl Co, Inc, Hackensack, N. J.
Leahy Mfg Co, E 8th St, Los Angeles, Calif.
Monarch Mfg Works, 2731 E Westmoreland St, Phila, Pa

Sure It's a Lot of Piping!

But it shows just a normal day's activity at the Shaw Plant - evidence that no matter what your problem is it will pay you to specify

DEPENDABLE **Shaw** **PIPING**

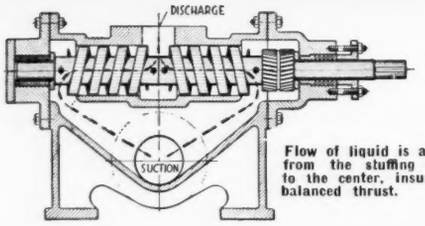
48 YEARS OF PRACTICAL EXPERIENCE

BENJ. F. SHAW COMPANY

2nd & Lombard Streets, Wilmington, Delaware

PIPING FABRICATORS AND CONTRACTORS

QUIMBY PUMPS
for FUEL OIL SERVICE



Flow of liquid is away from the stuffing box to the center, insuring balanced thrust.

SCREW PUMPS for High Pressure Service

Built for long life and minimum service costs, these pumps provide a pulseless flow of oil and thereby insure a steady flame at the burner tip. They can also be used for transfer work and to handle many other liquids both thin and viscous.

Two parallel shafts on which are mounted four screws arranged in pairs are the only moving parts. *There is no internal contact between screws or between screws and cylinder. The screws do not drive themselves, thus wear is reduced to a minimum.*

Built in capacities from 2 to 4200 g.p.m. at pressures up to 800 lb. per sq. in. depending on viscosities.

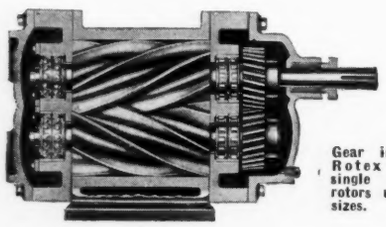
ROTEX PUMPS for Average Pressure Service

Highly efficient units for handling oils and other viscous liquids where working pressures and viscosities do not require higher pressure screw pump units.

There are only two moving parts. Pumping action is provided by timing gear driven single helical gear rotors. *There is no internal metal to metal contact between the rotors themselves or with the casing.*

Made in capacities up to 500 g.p.m. and for pressures up to 200 lb. per sq. in. depending on viscosity.

The Quimby Pump Company offers equipment not only for fuel oil but for almost any process liquid. In addition to the two rotary lines described above, there are three designs of pumps for acids and corrosive liquids. The Quimby line of standard water centrifugal pumps includes vertical types either sump or non-clog, horizontal type single and multi-stage horizontally split case, and vertically split-case non-clog and multivane.



Gear in head type Rotex Pump with single helical gear rotors used in large sizes.

QUIMBY

Use Coupon for Bulletins or Write for Quotation

QUIMBY PUMP CO.,
347 Thomas St., Newark, N. J.

Please send me bulletins on types of pumps indicated below.

ROTARY TYPES — CENTRIFUGAL TYPES

Screw ☐ Rotex ☐ — Double Suction ☐ Chemical ☐ Vertical ☐ — Multistage ☐ Non Clog ☐ Side Suction ☐ — Resilient Rubber Lined ☐

Name .....

Company .....

Address .....

Ray Oil Burner Co, 411 Bernal St, San Francisco, Calif.
Roper, Geo D, Corp, Dept PD, Rockford, Ill.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Tuthill Pump Co, 939 E 95th St, Chicago, Ill.

PUMP GOVERNORS
(See Governors, Pump)

PUMP VALVES
(See Valves, Pump)

PUMPS, CENTRIFUGAL
Allen-Sherman-Hoff Co, 227 S 15th St, Philadelphia, Pa.
Allis-Chalmers Mfg Co, Milwaukee, Wis.
Buffalo Pumps, Inc, 488 Broadway, Buffalo, N. Y.
De Laval Steam Turbine Co, Trenton, N. J.
Deming Co, 500 Broadway, Salem, Ohio.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Gardner-Denver Co, 100 Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Moore Steam Turbine Corp, 37 Coats St, Wellsville, N. Y.
Murray Iron Works, Burlington, Iowa.
Pacific Pump Works, 5715 Bicket St, Huntington Park, Cal.
Pennsylvania Pump & Compressor Co, Easton, Pa.
Quimby Pump Co, Inc, 347 Thomas St, Newark, N. J.
Warren Steam Pump Co, 1234 Bridges Ave, Warren, Mass.
Worthington Pump & Machinery Corp, Harrison, N. J.
Aldrich Pump Co, Allentown, Pa.
American Manganese Steel Co, 371 E 14th St, Chicago Heights, Ill.
American Marsh Pumps, 60 Capitol Ave, Battle Creek, Mich.
American Well Works, 100 N Broadway, Aurora, Ill.
Aurora Pump Co, 615 Loucks St, Aurora, Ill.
Barrett, Haentjens & Co, Hazleton, Pa.
Black-Clawson Co, Hamilton, O.
Boyts, Porter & Co, Connellsville, Pa.
Byron Jackson Co, Los Angeles, Calif.
Chicago Pump Co, Wolfram St, Chicago, Ill.
Coffin, J S, Jr, Co, Englewood, N. J.
Columbus Steam Pump Works Co, Columbus, Ohio
Cook, A D, Inc, Lawrenburg, Ind.
Davidson, M T, Co, 154 Nassau St, New York, N. Y.
Dayton-Dowd Co, Quincy, Ill.
Dean Brothers Co, Indianapolis, Ind.
Dean Hill Pump Co, Anderson, Ind.
Domestic Engine & Pump Co, Shippensburg, Pa.
Dunham, C A, Co, E Ohio St, Chicago, Ill.
Duriron Co, Inc, Dayton, Ohio
Economy Pumps, Inc, Hamilton, O.
Fairbanks, Morse & Co, 600 S Michigan Avenue, Chicago, Ill.
Foster Pump Works, Inc, 50 Washington St, Brooklyn, N. Y.
Frederick Iron & Steel Co, Frederick, Md.
Goulds Pumps, Inc, 301 Fall St, Seneca Falls, N. Y.
Goyne Steam Pump Co, Ashland, Pa.
Johnson Corp, 865 Wood St, Three Rivers, Mich.
Kraissl Co, Hackensack, N. J.
Lawrence Pump & Engine Co, Lawrence, Mass.
Lecourtenay Co, 5 Maine St, Newark, N. J.
Lewis, Chas S, & Co, Pine St at 22nd, St Louis, Mo.
McGowan, John H, Co, Cincinnati, Ohio
Manistee Iron Works Co, Manistee, Mich.
Micro-Westco, Inc, 104 State St, Bettendorf, Iowa
Morris Machine Works, 100 Genesee St, Baldwinsville, N. Y.
Nash Engrg Co, S Norwalk, C
Oliver United Filters, Inc, 290 Glascock St, Oakland, Cal
Pomona Pump Co, 111 E Commercial, Pomona, Calif.
Scranton Pump Mfg Co, Scranton, Pa.
Sterling Pump Corp, South Bend, Ind.
Taber Pump Co, 286 Elm S Buffalo, N. Y.
Union Steam Pump Co, Battle Creek, Mich.
Weil Pump Co, 215-17 W Superior St, Chicago, Ill.
Weinman Pump Co, Columbus O.
Wilson Snyder Mfg Corp, Pittsburgh, Pa.
Yeomans Bros Co, 1446 Dayton St, Chicago, Ill.
Yuba Mfg Co, San Francisco Calif.

PUMPS, DEEPWELL
Deming Co, 500 Broadway, Salem, Ohio
Jarecki Mfg Co, Erie, Pa.
Pacific Pump Works, 5715 Bicket St, Huntington Park, Calif.
Worthington Pump & Machinery Corp, Harrison, N. J.
American Marsh Pumps, 60 Capitol Ave, Battle Creek, Mich.
American Well Works, 100 N Broadway, Aurora, Ill.
Aurora Pump Co, 615 Loucks St, Aurora, Ill.
Byron Jackson Co, Los Angeles, Calif.
Columbus Steam Pump Works Co, Columbus, Ohio
Cook, A D, Inc, Lawrenceburg, Ind.
Davidson, M T, Co, 154 Nassau St, New York, N. Y.
Dean Hill Pump Co, Anderson, Ind.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Goulds Pumps, Inc, 301 Fall St, Seneca Falls, N. Y.
Kimball-Krogh Pump Co, Los Angeles, Calif.
Layne & Bowler, Inc, Memphis, Tenn.
Micro-Westco, Inc, 104 State St, Bettendorf, Iowa.
Morris Machine Works, 100 E Genesee St, Baldwinsville, N. Y.
Peerless Pump Division, 305 West Ave 26, Los Angeles, Calif.
Pomona Pump Co, 111 E Commercial, Pomona, Calif.
Roper, Geo D. Corp, Dept P D, Rockford, Ill.
Sterling Pump Corp, South Bend, Ind.
Yeomans Bros Co, 1446 Dayton St, Chicago, Ill.

PUMPS, PROPORTIONING
Proportioneers, Inc, 7 Codding St, Providence, R. I.
Roy, Milton, Pump Co, 2031 E Madison St, Philadelphia, Pa.

PUMPS, RECIPROCATING, PISTON
Allis-Chalmers Mfg Co, Milwaukee, Wis.
Buffalo Pumps, Inc, 488 Broadway, Buffalo, N. Y.
Deming Co, 500 Broadway, Salem, Ohio
Gardner-Denver Co, 100 Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Warren Steam Pump Co, 1234 Bridges Ave, Warren, Mass.
Watson-Stillman Co, Roselle, N. J.
Worthington Pump & Machinery Corp, Harrison, N. J.
American Marsh Pumps, 60 Capitol Ave, Battle Creek, Mich.
Columbus Steam Pump Works Co, Columbus, Ohio
Cook, A D, Inc, Lawrenceburg, Ind.
Davidson, M T, Co, 154 Nassau St, New York, N. Y.
Dean Brothers Co, Indianapolis, Ind.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill
Foster Pump Works, 50 Washington St, Brooklyn, N. Y.

Gaso Pump & Burner Mfg, Co, Tulsa, Okla.
Goulds Pumps, Inc, 301 Falls St, Seneca Falls, N. Y.
Kraissl Co, Hackensack, N. J.
McGowan, John H, Co, Cincinnati, Ohio
National Steam Pump Co, Upper Sandusky, Ohio
Roper, Geo D, Corp, Dept PD, Rockford, Ill.
Scranton Pump Mfg Co, Scranton, Pa.
Union Steam Pump Co, Battle Creek, Mich.
Wagener Steam Pump Co, Canton, Ohio
Wilson Snyder Mfg Corp, Pittsburgh, Pa.

PUMPS, ROTARY

Blackmer Pump Co, 2200 Century Ave, Grand Rapids, Mich.
De Laval Steam Turbine Co, Trenton, N. J.
Eddington Metal Specialty Co, Box K, Eddington, Pa.
Quimby Pump Co, Inc, 347 Thomas St, Newark, N. J.
Viking Pump Co, 404 Deewer St, Cedar Falls, Iowa
Worthington Pump & Machinery Corp, Harrison, N. J.
Fairbanks, Morse & Co, 600 S Michigan Avenue, Chicago Ill.
Foster Pump Works, 50 Washington St, Brooklyn, N. Y.
Goulds Pumps, Inc, 301 Falls St, Seneca Falls, N. Y.
Kinney Mfg Co, Washington St, Boston, Mass.
Kraissl Co, Hackensack, N. J.
Northern Pump Co, Minneapolis, Minn.
Oilgear Co, 1421 W Bruce St, Milwaukee, Wis.
Roper, Geo D, Corp, Dept PD, Rockford, Ill.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Taber Pump Co, 286 Elm St, Buffalo, N. Y.
Tuthill Pump Co, 939 E 95th St, Chicago, Ill.

PUMPS, SUMP

Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
De Laval Steam Turbine Co, Trenton, N. J.
Deming Co, 500 Broadway, Salem, Ohio.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Quimby Pump Co, Inc, 347 Thomas St, Newark, N. J.
Worthington Pump & Machinery Corp, Harrison, N. J.
American Marsh Pumps, 60 Capitol Ave, Battle Creek, Mich.
Aurora Pump Co, 615 Loucks St, Aurora, Ill.
Byron Jackson Co, Los Angeles, Calif.
Chicago Pump Co, Wolfram St, Chicago, Ill.
Columbus Steam Pump Works Co, Columbus, Ohio
Davidson, M T, Co, 154 Nassau St, New York, N. Y.
Dayton Pump & Mfg Co, Dayton, Ohio
Dean Brothers Co, Indianapolis, Ind.
Dean Hill Pump Co, Anderson, Ind.
Economy Pumps, Inc, Hamilton, O.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Frederick Iron & Steel Co, Frederick, Md.
Goulds Pumps, Inc, 301 Falls St, Seneca Falls, N. Y.
Kraissl Co, Hackensack, N. J.
Lawrence Pump & Engine Co, Lawrence, Mass.
McGowan, John H, Co, Cincinnati, Ohio.
Micro-Westco, Inc, 104 State St, Bettendorf, Iowa
Morris Machine Works, 100 E Genesee St, Baldwinsville, N. Y.
Nash Engrg Co, S Norwalk, Conn.
Nye Steam Pump & Machinery Co, S Kolmar Ave, Chicago, Ill.
Roper, Geo D, Corp, Dept PD, Rockford, Ill.
Sterling Pump Corp, South Bend, Ind.
Taber Pump Co, 286 Elm St, Buffalo, N. Y.
Union Steam Pump Co, Battle Creek, Mich.
Weil Pump Co, 215-17 W Superior St, Chicago, Ill.
Yeomans Bros, Co, 1446 Dayton St, Chicago, Ill.

PUMPS, VACUUM

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Chicago Pneumatic Tool Co, 6-8 E 44th St, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Fuller Co, 111 Bridge St, Catasauqua, Pa.
Gardner-Denver Co, 100 Gardner Drive, Quincy, Ill.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Pennsylvania Pump & Compressor Co, Easton, Pa.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Warren Steam Pump Co, 1234 Bridges Ave, Warren, Mass.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
American Marsh Pumps, 60 Capitol Ave, Battle Creek, Mich.
Barrett, Haentjens & Co, Hazleton, Pa.
Chicago Pump Co, Wolfram St, Chicago, Ill.
Columbus Steam Pump Works Co, Columbus, Ohio
Davidson, M T, Co, 154 Nassau St, New York, N. Y.
Dean Brothers Co, Indianapolis, Ind.
Dunham, C A, Co, E Ohio St, Chicago, Ill.
Foster Pump Works, Inc, 50 Washington St, Brooklyn, N. Y.
Gaso Pump & Burner Mfg Co, Tulsa, Okla.
Goulds Pumps, Inc, 301 Falls St, Seneca Falls, N. Y.
Goyne Steam Pump Co, Ashland, Pa.
Hoffman Specialty Co, Inc, Waterbury, Conn.
Kinney Mfg Co, Washington St, Boston, Mass.
Kraissl Co, Hackensack, N. J.
McGowan, John H, Co, Cincinnati, Ohio
Micro-Westco, Inc, 104 State St, Bettendorf, Iowa
Nash Engrg Co, S Norwalk, Conn.
Oliver United Filters, Inc, 2900 Glascock St, Oakland, Calif.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Union Steam Pump Co, Battle Creek, Mich.
Wagener Steam Pump Co, Canton, Ohio.
Whittington, W P, & Co, Indianapolis, Ind.
Yeomans Bros Co, 1446 Dayton St, Chicago, Ill.

PURIFIERS, GAS

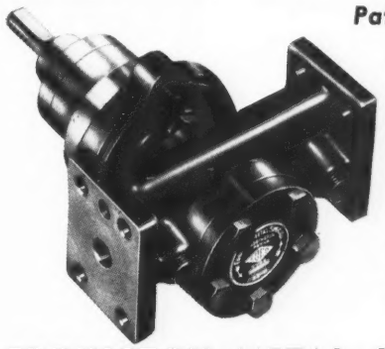
Centrifix Corp, Dept P, 3029 Prospect Ave, Cleveland, O.
American Solvent Recovery Corp, Columbus, Ohio
International Filter Co, 325 W 25th Place, Chicago, Ill.
Isbell-Porter Co, Newark, N. J.
Koppers Co, Pittsburgh, Pa.
Peabody Engrg Corp, 580 5th Ave, New York, N. Y.

PURIFIERS, OIL, CENTRIFUGAL

De Laval Separator Co, 165 Broadway, New York, N. Y.
Hilliard Corp, 4 W 4th St, Elmira, N. Y.
Buckeye Laboratories, Inc, Box 748, Alliance, Ohio
Goulds Pumps, Inc, 301 Falls St, Seneca Falls, N. Y.
Sharples Corp, Phila, Pa.

EDCO VANE TYPE ROTARY PUMPS

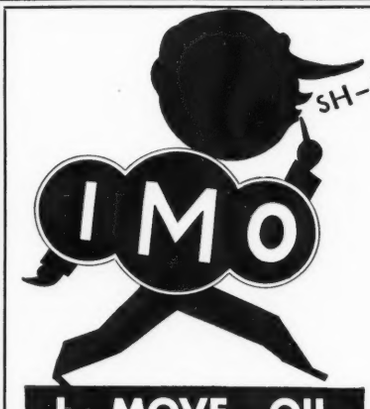
Patented Construction



At high or low speeds, whether creating a 28" vacuum or developing extremely high pressures, the vanes of EDCO Pumps maintain effective spanning position without depending on springs or centrifugal action. . . . Furnished in capacities from 2 GPH up in any required corrosion-resisting material. Operate silently at all speeds and require almost no maintenance during years of service. Widely used for fuel oils as well as other fluids of any specific gravity. . . . Write us today for complete technical data (Bulletin No. 936).

EDDINGTON METAL SPECIALTY CO.
EDDINGTON, PENNSYLVANIA

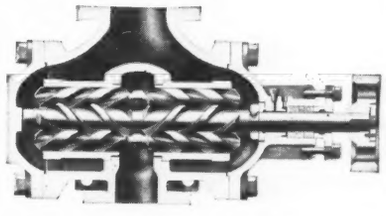
HIGH EFFICIENCY PURIFYING EQUIPMENT
for
REMOVING DIRT, WATER, OIL and ALL OTHER ENTRAINMENT
from Steam—Vapor—Gas—Air
Applications:—
LINES•BOILERS•RECEIVERS•EVAPORATORS
CENTRIFIX CORPORATION
3029 PROSPECT AVE., CLEVELAND, OHIO
WRITE FOR CATALOG



IMO *is Quiet!*

Pump noises speak louder than words can do of wasted energy, but you can hear a whisper above an IMO.

Let us tell you why. Ask for Catalog 1-44

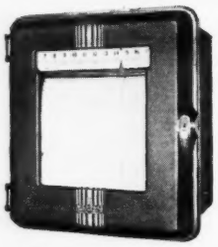


I MOVE OIL

DE LAVAL STEAM TURBINE CO., TRENTON, N. J.

PYROMETERS

MICROMAX RECORDERS AND CONTROLLERS



Micromax Strip-Chart Temperature Recorder

Micromax Round-Chart Temperature Recorder

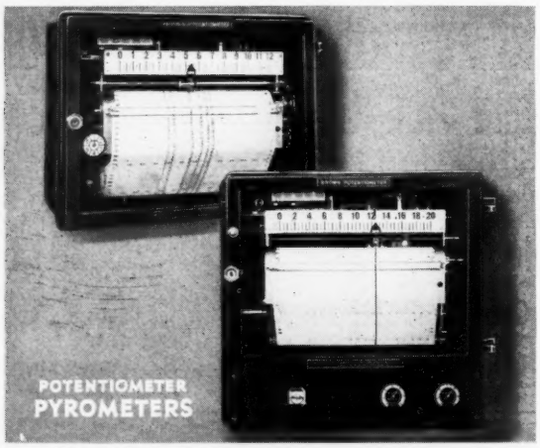
These Micromax balance-type temperature recorders are sturdy, motor-driven machines which indicate, record and control temperature with reliability and accuracy. Their charts furnish detailed records in ink. The strip-chart Micromax can record temperatures of as many as 16 points. Round-chart Micromax has an extra-bold indicating scale.

Applications in the power plant include temperature of: flue gas and preheater air, feedwater, steam, cooling water, condensate, turbine bearings, generator stator, generator rotor, generator bearings, transformers and synchronous condensers.

Write for catalogs.

LEEDS & NORTHRUP COMPANY
4987 Stenton Avenue, Philadelphia, Pa.

LEEDS & NORTHRUP



For Controlling, Recording and Indicating Temperatures from —200° F to +3300° F.

An extremely accurate and dependable instrument, designed and built for industrial service. Operating on the Potentiometer Principle, the instrument can be located any distance from the point of temperature measurement (thermocouple location) without affecting its accuracy or dependability.

Charts and scales for a wide variety of ranges are available, from a minimum temperature span of 200° to a maximum span of 3000° F. Corresponding Centigrade scales and charts are also available.

Pyrometer accessories, such as thermocouples and extension lead wire, furnished with instruments to meet the individual requirements of each job.

Write for Catalog 1103. THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4490 Wayne Avenue, Philadelphia, Pa.

BROWN PYROMETERS

To Measure and Control is to Economize

PURIFIERS, WATER

American Sand-Banum Co, Dept MP., 9 Rockefeller Plaza, New York, N. Y.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Elgin Softener Corp, Elgin, Ill.
Graver Tank & Mfg Co, Inc, East Chicago, Ind.
National Aluminate Corp, 6222 W 66th Place, Chicago, Ill.
Permutit Co, Dept A, 330 W 42nd St, New York, N. Y.
Scaife, Wm B, & Sons Co, River & Ann Sts, Oakmont, Pa.
American Doucil Co, 121 S 3rd St, Philadelphia, Pa.
American Water Softener Co, 4th & Lehigh Sts, Phila, Pa.
Filtrators Co, Inc, 96 Liberty St, New York, N. Y.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
International Filter Co, 325 W 25th Place, Chicago, Ill.
Mohawk Water Treatment Co, Cleveland, Ohio

PYROMETERS

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Taylor Instrument Cos, Rochester, N. Y.
Bacharach Industrial Inst Co, 7000 Bennett, Pittsburgh, Pa.
Bristol Co, Waterbury, Conn.
Englehard, Charles, Inc, 234 NJRR Ave, Newark, N. J.
Pyrometer Instrument Co, 103-A Lafayette St, New York, N. Y.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.
Tagliabue, C J, Mfg Co, Park & Nostrand, Brooklyn, N. Y.

RADIATOR VALVES

(See Valves, Radiator)

RADIATORS, HEATING

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Fedders Mfg Co, 63 Tonawanda St, Buffalo, N. Y.
Grinnell Co, 227 W Exchange St, Providence, R. I.
Webster, Warren, & Co, Camden, N. J.
American Radiator Co, 40 W 40th St, New York, N. Y.
Burnham Boiler Corp, Irvington, N. J.
Dunham, C A, Co, E Ohio St, Chicago, Ill.
Hugo Mfg Co, West Duluth, Minn.
McCord Radiator & Mfg Co, E Grand Blvd, Detroit, Mich.
Nesbitt, John J, Inc, Holmesburg, Pa.
Rome-Turney Radiator Co, 200 Lynch St, Rome, N. Y.
Thatcher Furnace Co, St Francis St, Newark, N. J.
Trane Co, 2012 Cameron Ave, LaCrosse, Wis.
U. S. Radiator Corp, Detroit, Mich.
Vulcan Radiator Co, Francis Ave, Hartford, Conn.
Young Radiator Co, Racine, Wis.

REACTORS, ELECTRIC, CAPACITIVE AND INDUCTIVE

Allis-Chalmers Mfg Co, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Cornell-Dubilier Electric Corp, 1000 Hamilton, S Plainfield, N. J.
Metropolitan Electric Mfg Co, 22–48 Steinway, Long Island City, N. Y.

RECEIVERS, AIR

Brownell Co, 301 N Findlay St, Dayton, Ohio
Chicago Bridge & Iron Co, 2131 Old Colony Bldg, Chicago, Ill.
Chicago Pneumatic Tool Co, 6–8 E 44th St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Pennsylvania Pump & Compressor Co, Easton, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Bass Foundry & Machine Co, Fort Wayne, Ind.
Bigelow Co, 200-220 River St, New Haven, Conn.
Bos-Hatten, Inc, Buffalo, N. Y.
Chattanooga Boiler & Tank Co, Box 110, Chattanooga, Tenn.
Farrar & Trefts, Inc, Buffalo, N. Y.
Hardie-Tynes Mfg Co, Birmingham, Ala.
Leader Iron Works, Decatur, Ill.
Milwaukee Reliance Boiler Works, Milwaukee, Wis.
Morrison Bros, Dubuque, Iowa
Pangborn Corp, Box 3809, Hagerstown, Md.
Pennsylvania Boiler Works, 12th & Pennsylvania Ave, Erie, Pa.
Petroleum Iron Works Co, Sharon, Pa.
Pittsburgh Des Moines Steel Co, Pittsburgh, Pa.
Pressed Steel Tank Co, S 66th St, Milwaukee, Wis.
Stover Steel Tank & Mfg Co, Freeport, Ill.
Sullivan Machinery Co, Michigan City, Ind.
Titusville Iron Works Co, Titusville, Pa.
Westinghouse Air Brake Co, Wilmerding, Pa.
York Ice Machry Corp, York, Pa.
Youngstown Steel Tank Co, Youngstown, Ohio

RECTIFIERS, ELECTRIC

Allis-Chalmers Mfg Co, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.

REFRACTORIES

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Carborundum Co, Dept P, Perth Amboy, N. J.
DeWolf Furnace Corp, 77 South Ave, Rochester, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Smith, Sanford C, Refractories, Inc, 1715 Niagara St, Buffalo, N. Y.
Acme Brick Co, Fort Worth, Tex.
American Arch Co, New York, N. Y.
Bernitz Furnace Appliance Co, 89 Broad St, Boston, Mass.
Carolina Refractories Co, Hartsville, S. C.
Chicago Fire Brick Co, 1463 Elston Ave, Chicago, Ill.
Detrick, M H, Co, 140 S Dearborn St, Chicago, Ill.
Denver Fire Clay Co, 2301 Blake St, Denver, Colo.
Drake Non-Clinkering Furnace Block Co, Beekman St, New York, N. Y.

Look for the noun in the product listing, for example:

"Regulators, Feedwater"

not

"Feedwater Regulators"

Electro Refractories Corp, Andrews Bldg, Buffalo, N. Y.
Fulkner, J A, Refractories Co, W Federal St, Youngstown, O.
Furnace Economy Co, N Wells St, Chicago, Ill.
General Refractories Co, 1600 Real Estate Trust Bldg, Philadelphia, Pa.
Green, A P, Fire Brick Co, 1020 Breckenridge, Mexico, Mo.
Ladle-Christy Clay Products Co, 411 N 7th St, St Louis, Mo.
Louisville Fire Brick Works, Inc, Louisville, Ky.
McLeod & Henry Co, Inc, 31 Monroe St, Troy, N. Y.
Mexico Refractories Co, Mexico, Mo.
Norton Co, Worcester, Mass.
Perolin Co of America, Chicago, Ill.
Plibrico Jointless Firebrick Co, 1818 Kingsbury, Chicago, Ill.
Pyro Clay Products Co, Oak Hill, Ohio
Quigley Co, Inc, 56 W 45th St, New York, N. Y.
Ramtite Co, 2563 W 18th St, Chicago, Ill.
Refractory & Insulation Corp, 381 4th Ave, New York, N. Y.
Reintjes, Geo P, Co, 2517 Jefferson St, Kansas City, Mo.
Seaboard Refractories Co, P O Box 327, Perth Amboy, N. J.
U. S. Stoneware Co, 62 E 42 St, New York, N. Y.

REFRIGERATING SYSTEMS

Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.
Baker Ice Machine Co, Inc, Omaha, Neb.
Carrier Corp, Syracuse, N. Y.
Ross Heater & Mfg Co, Inc, 1409 West Ave, Buffalo, N. Y.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.
York Ice Machry Corp, York, Pa.

REGULATING VALVES

(See Valves, Regulating)

REGULATORS, DAMPER

Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Engineer Co, 17 Battery Place, New York, N. Y.
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Hays Corp, 905 E 8th St, Michigan City, Ind.
Hoffman Specialty Co, Inc, Waterbury, Conn.
Johnson Service Co, 509 E Michigan St, Milwaukee, Wis.
Leeds & Northrup Co, 4970 Stenton Ave, Phila, Pa.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Askania Regulator Co, S Michigan Ave, Chicago, Ill.
Atwood & Morrill Co, Salem, Mass.
Bristol Co, Waterbury, Conn.
Defender Automatic Regulator Co, St. Louis, Mo.
d'Este, Julian Co, 6 Spice St, Charlestown, Mass.
Field Mfg Co, 2328 Nelson Ave, Chicago, Ill.
Friez, Julian P, & Sons, 4 N Central Ave, Baltimore, Md.
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Kitts Steam Specialty Co, 272 W Second St, Oswego, N. Y.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Philadelphia, Pa.
Morey & Jones, Ltd, Room 1010, 922 S Hemlock St, Los Angeles, Calif.
Power Turbo-Blower Co, 30 Vesey St, New York, N. Y.
Robertson, Jas L, 3rd, 116 Broad St, New York, N. Y.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Watts Regulator Co, Lawrence, Mass.

REGULATORS, ELECTRIC-CURRENT-DEMAND

General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Esterline-Angus Co, Box 596, Indianapolis, Ind.

REGULATORS, FEEDWATER

Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Chaplin-Fulton Mfg Co, Pittsburgh, Pa.
Henszey Co, Dept D-14, Watertown, Wis.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Squires, C E, Co, E 40th St & Kelley Ave, Cleveland, O.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Askania Regulator Co, S Michigan Ave, Chicago, Ill.
Defender Automatic Regulator Co, St. Louis, Mo.
Eclipse Fuel Engrg Co, 707 S Main St, Rockford, Ill.
Kitts Steam Specialty Co, 272 W 2nd St, Oswego, N. Y.
McAlear Mfg Co, Chicago, Ill.
McDonnell & Miller, Room 1305, Wrigley Bldg, Chicago, Ill.
Mercon Regulator Co, 2357 N 29th St, Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Plouff Co, Columbus Ave, Boston, Mass.
Watts Regulator Co, Lawrence, Mass.
Williams Gauge Co, 1938 Pennsylvania Ave, N S, Pittsburgh, Pa.

REGULATORS, FREQUENCY, ELECTRIC-GENERATOR

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Burlington Instrument Corp, 301 N Main, Burlington, Iowa
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.

REGULATORS, LIQUID-LEVEL

Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Builders Iron Foundry, 7 Codding St, Providence, R. I.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Chaplin-Fulton Mfg Co, Pittsburgh, Pa.
Cochrane Corp, 3106 N 17 St, Philadelphia, Pa.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.

CONTROLLERS

FOR FREQUENCY, LOAD, COMBUSTION, TEMPERATURE, CONDENSATE PURITY

Frequency and load control equipment for handling rapidly and automatically the most complex load-frequency conditions in large interconnected systems, or to regulate operation of smallest individual station.

Metermax Combustion Control for boiler furnaces. All controls assembled on a single panel and connected at factory. Maintains high efficiency while meeting load swings of any magnitude.

Also controllers for temperature, condensate purity, and pH. Write for catalogs.

LEEDS & NORTHRUP COMPANY
4987 Stenton Avenue, Philadelphia, Pa.

LEEDS & NORTHRUP

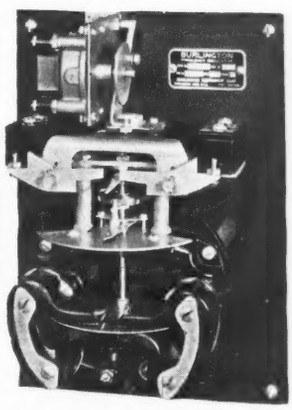
BURLINGTON

FREQUENCY REGULATORS

Voltage Regulators
Power Factor Regulators
Automatic Synchronizers

The Burlington Frequency Regulator maintains very accurate frequency on generating systems. Electric clocks on such systems will be within 1/10 second of the exact time as given by station master clock. Proportionate load control automatically divides the load among the several generating plants in the station.

Write for Bulletins covering Burlington instruments.



BURLINGTON INSTRUMENT CORP.
BURLINGTON, IOWA

Cut your refrigeration POWER COSTS!

IF you are responsible for the operation of a compression type refrigeration system, we believe it will be well worth your while to know about the advantages offered by the new Armstrong Purger:

1. CUTS POWER COSTS—Records show reductions in head pressure of as much as 45 lbs. and power savings as high as 22% where purgers have been installed.

2. LOW COST—The unit lists at only $100.00. Savings quickly pay for it!

3. AUTOMATIC—Ordinarily, no manual attention is required after the Purger is installed. When the system needs purging, the Purger goes to work!

4. INCREASES COMPRESSOR CAPACITY—Every 4 lbs. reduction in head pressure increases compressor capacity approximately 1%!

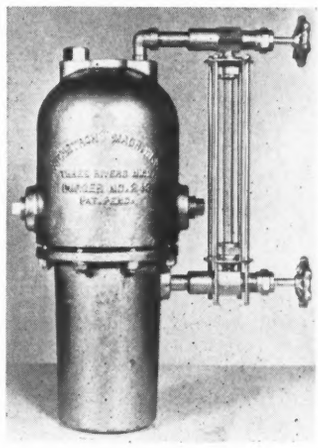
5. LARGE CAPACITY—The No. 243 Purger shown here has been used successfully on systems ranging in size from 12 tons up to 800 tons capacity.

6. MINIMUM LOSS OF REFRIGERANT GAS—Condensation within Purger takes place at high side pressure, but at low side temperature.

7. DEPENDABLE—The Armstrong Purger is time tested. It is simple, rugged. All working parts are made of stainless steel.

8. FLOAT SERVICE, TOO—The Purger can be used as combination purger and high side float where desired!

We will be glad to send you complete information. Write. ARMSTRONG MACHINE WORKS, 812 Maple Street, Three Rivers, Michigan.



Use an ARMSTRONG PURGER

Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe Ave, Newark, N. J.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Taylor Instrument Cos, Rochester, N. Y.
Askania Regulator Co, S Michigan Ave, Chicago, Ill.
Atwood & Morrill Co, Salem, Mass.
Bristol Co, Waterbury, Conn.
Defender Automatic Regulator Co, St Louis, Mo.
d'Este, Julian, Co, 6 Spice St, Charlestown, Mass.
General Controls Co, 267 5th Ave, Glendale, Calif.
Griscom-Russell Co, 285 Madison Ave, New York, N. Y.
Justus Steam Trap Co, Box 26, Napanoch, N. Y.
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Mercon Regulator Co, 2357 N 29th St, Milwaukee, Wis.
National Gas Equipment, Inc, 539 Petroleum Securities Bldg, Los Angeles, Calif.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.
Watts Regulator Co, Lawrence, Mass.

REGULATORS, PRESSURE

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Atlas Valve Co, 289 South St, Newark, N. Y.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Chaplin-Fulton Mfg Co, Pittsburgh, Pa.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Fulton Sylphon Co, Knoxville, Tenn.
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Hays Corp, 905 8th St, Michigan City, Ind.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Taylor Instrument Cos, Rochester, N. Y.
American Meter Co, Inc, 60 E 42nd St, New York, N. Y.
Askania Regulator Co, S Michigan Ave, Chicago, Ill.
Atwood & Morrill Co, Salem, Mass.
Bell & Gossett Co, Chicago, Ill.
Bristol Co, Waterbury, Conn.
Defender Automatic Regulator Co, St. Louis, Mo.
d'Este, Julian Co, 6 Spice St, Charlestown, Mass.
Grove Regulator Co, 1729 Poplar St, Oakland, Calif.
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Kitts Steam Specialty Co, 272 W 2nd St, Oswego, N. Y.
Mercon Regulator Co, 2357 N 29th St, Milwaukee, Wis.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Philadelphia, Pa.
Natural Gas Equipment, Inc. 539 Petroleum Securities Bldg, Los Angeles, Calif.
Plouff Co, Columbus Ave, Boston, Mass.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Shallcross Controls, Inc, 121 N Broadway, Milwaukee, Wis.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.
Staples & Pfeiffer, Ltd, Bryant St, San Francisco, Calif.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.
Watts Regulator Co, Lawrence, Mass.

REGULATORS, SPEED, ELECTRIC-MOTOR

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Allen-Bradley Co, Milwaukee, Wis.

REGULATORS, TEMPERATURE

Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Fulton Sylphon Co, Knoxville, Tenn.
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Taylor Instrument Cos, Rochester, N. Y.
American Radiator Co, 40 W 40th St, New York, N. Y.
Askania Regulator Co, S Michigan Ave, Chicago, Ill.
Automatic Temperature Control Co, Germantown Ave & Logan St, Philadelphia, Pa.
Barber-Colman Co, Rockford, Ill.
Bristol Co, Waterbury, Conn.
d'Este Julian Co, 6 Spice St, Charlestown, Mass.
Engelhard, Charles, Inc, 234 NJRR Ave, Newark, N. J.
Friez, Julien P, & Sons, Inc, 4 N Central Ave, Baltimore, Md.
Jefferson Electric Co, Bellwood, Ill.
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Spence Engrg Co Inc, 61 Grant St, Walden, N. Y.
Tagliabue, C J, Mfg Co, Park & Nostrand, Brooklyn, N. Y.

REGULATORS, VOLTAGE

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Burlington Instrument Corp, 301 N Main St, Burlington, Iowa.
Electric Machinery Mfg Co, 1331 Tyler St, N E, Minneapolis, Minn.
General Electric Co, Schenectady, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.

RELAYS, ELECTRIC

Cutler Hammer, Inc, 606 N 12th St, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Allen-Bradley Co, Milwaukee, Wis.
Autocall Co, Shelby, Ohio
Automatic Switch Co, 41 E 11 St, New York, N. Y.
Esterline-Angus Co, Box [illegible] Indianapolis, Ind.
Friez, Julian P, & Sons, [illegible] Central Ave, Baltimore, [illegible]
General Controls Co, 267 Ave, New York, N. Y.
Mercoid Corp, 4229 Belm[illegible] Ave, Chicago, Ill.
Minneapolis-Honeywell Regu[illegible]tor Co, 4490 Wayne A[illegible] Phila, Pa.
Roller-Smith Co, 1766 W Mar[illegible] St, Bethlehem, Pa.
Signal Engrg & Mfg Co, 161 14th St, New York, N. Y.

RELIEF VALVES

(See Valves, Relief)

REPAIR WORK, BOILER

Brownell Co, 301 N Findlay [illegible], Dayton, Ohio
Combustion Engrg Co, Inc, [illegible] Madison Ave, New York, N. [illegible]
Bigelow Co, 200-22 River [illegible], New Haven, Conn.
Dover Boiler Works, 90 [illegible] Dickinson St, Dover, N. J.
Kroeschell Boiler Co, Racine, Wis.

REPAIR WORK, CHIMNEY

American Chimney Co, 147 4th Ave, New York, N. Y.
Cutshall, J M, & Sons, Brazil, Ind.
Custodis, Alphons, Chimney Const Co, 80 Broad St, New York, N. Y.
Continental Chimney Co, 127 N Dearborn St, Chicago, Ill.
Rust Engrg Co, Pittsburgh, Pa.
Weber Chimney Co, 332 S Michigan Ave, Chicago, Ill.

REPAIR WORK, ENGINE

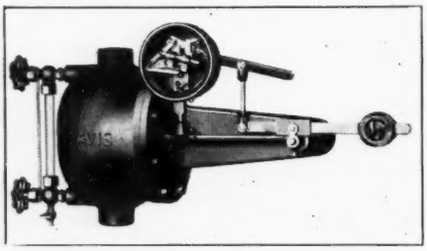
Brownell Co, 301 N Findlay St, Dayton, Ohio
Murray Iron Works Company, Burlington, Iowa
Nordberg Mfg Co, 3073 S Chase Ave, Milwaukee, Wis.
Dissinger, C H A, & Bros Co, Inc, Wrightsville, Pa.
Franklin Machine Co, Providence, R. I.
Providence Engrg Works Inc, Providence, R. I.
Watertown Engine & Machine Co, Watertown, N. Y.

RHEOSTATS

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Biddle Jas G, Co, 1211-13 Arch St, Philadelphia, Pa.
Cutler-Hammer, Inc, 606 N 12th St, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Monitor Controller Co, Lombard & Gay Sts, Baltimore, Md.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Allen-Bradley Co, Milwaukee, Wis.
Clark Controller Co, Cleveland, Ohio
Cooley Electric Mfg Corp, 217 S Senhte, Indianapolis, Ind.
Hanson-Van Winkle-Munning Co, Matawan, N. J.

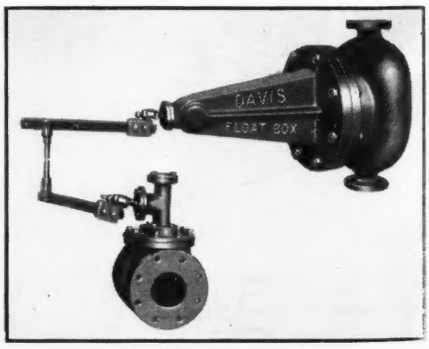
LIQUID LEVEL CONTROLLERS

Below—No. 164 FLOAT BOX—For external mounting on closed tanks. Operates mercury tube, snap or explosion-proof switch for controlling pump motor, solenoid valve, motor operated valve, or alarm, or any combination of these units.



DAVIS offers 11 different styles of liquid level controllers and 6 different types of fluid control valves—all in a complete range of sizes and for all types of service. We will be glad to send catalog and to make recommendations.

DAVIS
REGULATOR CO.
2540 S. Washtenaw Ave.
Chicago, Ill.



Above—Davis Liquid Level Controls include units featuring the new "DIA-BALL" packless heads. The combination above shows a No. 161 D Packless Float Box actuating a No. 66 B Packless Balanced Valve

RINGS, PISTON

Cook, C Lee, Mfg Co, 916 S 8th St, Louisville, Ky.
American Hammered Piston Ring Div, Baltimore, Md.
Aluminum Industries Inc, 2146-38 Beekman St, Cincinnati, O.
Barnett Foundry & Machine Co, Woolsey St, Irvington, N. J.
Bearium Metals Corp, 258 State St, Rochester, N. Y.
Burd Piston Ring Co, Rockford, Ill.
Double-Seal Ring Corp, 305 E 45 St, New York, N. Y.
Holland Piston Ring Co, Holland, Mich.
McQuay-Norris Mfg Co, St. Louis, Mo,
Mellor Packing Mfg Co, 332 Ocean Ave, Jersey City, N. J.
Perfect Circle Co, Hagerstown, Md.
Sealed Power Corp, Muskegon, Mich.
Skinner Chuck Co, New Britain, Conn.
Wilkening Mfg Co, 2009 S 71st St, Philadelphia, Pa.

ROCK WOOL

(See Wool, Rock)

RODS, WELDING

Chase Brass & Copper Co, Inc, Waterbury, Conn.
Haynes Stellite Co, 30 E 42nd St, New York, N. Y.
Lincoln Electric Co, 12818 Coit Rd Cleveland, Ohio
Linde Air Products Co, 30 E 42nd St, New York, N. Y.
Scovill Mfg Co, 99 Mill St, Waterbury, Conn.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Air Reduction Sales Co, 60 E 42nd St, New York, N. Y.
Driver-Harris Co, Harrison, N. J.
Firth-Sterling Steel Co, McKeesport, Pa.
Harnischfeger Corp, Milwaukee, Wis.
Hobart Bros Co, Troy, Ohio
McKay Co, York, Pa.
Metal & Thermit Corp, 120 Broadway, New York, N. Y.
Modern Engrg Co, St Louis, Mo.
Revere Copper & Brass Inc, 225 5th Ave, New York, N. Y.
Ryerson, Joseph T, & Son, Inc, Rockwell St, Chicago, Ill.
Stoody Co, Whittier, Calif.
Torchweld Equipment Co, 1035 W Lake St, Chicago, Ill.
Weldcraft Equipment Co, 2623 Liberty Ave, Pittsburgh, Pa.

Look for the noun in the product listing, for example:

"Rings, Piston"
not
"Piston Rings"

ROPE, WIRE

American Chain & Cable Co, Wilkes-Barre, Pa.
Jones & Laughlin Steel Corp, Pittsburgh, Pa.
Roebling's, John A, Sons Co, 640 S Broad St, Trenton, N. J.
Wickwire Spencer Steel Co, 500 5th Ave, New York, N. Y.
American Steel & Wire Co, Pittsburgh, Pa.
Broderick & Bascom Rope Co, St. Louis, Mo.
Leschen, A, & Sons Rope Co, 5909 Kennerly Ave, St. Louis Mo.
Macwhyte Co, Kenosha, Wis.
Union Wire Rope Corp, Kansas City Mo.
Williamsport Wire Rope Co, S Michigan Ave, Chicago, Ill.

ROTARY CONVERTERS

(See Converters, Rotary)

RUST REMOVERS

(See Compounds, Rust-Removing)

SAFETY APPLIANCES

(Goggles, Masks, Belts, Etc.)
Mine Safety Appliance Co, Pittsburgh, Pa.

SANDBLAST EQUIPMENT

American Foundry Equipment Co, Mishawaka, Ind.
McLeod Co, 2236 Bogen St, Cincinnati, Ohio
Mott Sand Blast Mfg Co, Flourney St, Chicago, Ill.
Pangborn Corp, Box 3809, Hagerstown, Md.
Ruemelin Mfg Co, Milwaukee, Wis.
Sly, W W, Mfg Co, Cleveland, Ohio

SCALES, WEIGH

Builders Iron Foundry, 7 Codding St, Providence, R. I.
Richardson Scale Co, 690 Van Houten Ave, Chicago, Ill.
Chatillon, John, & Sons, 85 Cliff St, New York, N. Y.
Exact Weight Scale Co, 44 W 5th Ave, Columbus, Ohio
Fairfield Engrg Co, 305 Barnhart St, Marion, Ohio
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Jacobs Bros Co, Inc, 1 Main St, Brooklyn, N. Y.
Merrick Scale Mfg Co, 178 Autumn St, Passaic, N. J.
Stock Engrg Co, 429 Penton Bldg, Cleveland, Ohio
Streeter-Amet Co, 4101 Ravenswood, Box P, Chicago, Ill.
Syntron Co, 492 Lexington Ave, Homer City, Pa.
Toledo Scale Co, Power Sales Div, Toledo, Ohio

SCREENS, BAR

Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Beach-Russ Co, 50 Church St, New York, N. Y.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Colonial Iron Works Co, 17643 St. Clair Ave, Cleveland, O.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Maddox Foundry & Machine Works, Inc, Archer, Fla.

SCREENS, TRAVELING

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Andale Co, Philadelphia, Pa.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Cuno Engrg Corp, Meriden, Conn.

SEPARATORS, COMPRESSED-AIR

Centrifix Corp, Dept P, 3029 Prospect Ave, Cleveland, Ohio
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Leavitt Machine Co, 8 E River St, Orange, Mass.
Nicholson, W H, & Co, 125 Oregon St, Wilkesbarre, Pa.
Straight Line Foundry & Machine Corp, 218 S Geddes St, Syracuse, N. Y.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Andale Co, Philadelphia, Pa.
Dri-Steam Valve Sales Corp, 70 E 45th St, New York, N. Y.
Master Separator & Valve Co, 607 S Hill St, Los Angeles, Calif.
Ruemelin Mfg Co, Milwaukee, Wis.

SEPARATORS, MAGNETIC

Cutler-Hammer Inc, 606 N 12th St, Milwaukee, Wis.
Barnard & Leas Mfg Co, Moline, Ill.
Dings Magnetic Separator Co, Milwaukee, Wis.
Electric Controller & Mfg Co, Cleveland, Ohio
Exolon Co, Blasdell, N. Y.
Ohio Electric Mfg Co, Cleveland, Ohio
Robinson Mfg Co, Muncy, Pa.
Stearns Magnetic Mfg Co, Milwaukee, Wis.
Stearns-Roger Mfg Co, Denver, Colo.
Tabor Mfg Co, Tacony St, Philadelphia, Pa.

SEPARATORS, OIL

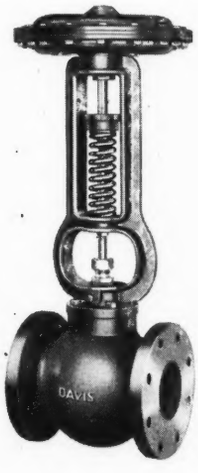
Centrifix Corp, Dept P, 3029 Prospect Ave, Cleveland, Ohio
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Elliott Co, Jeannette, Pa.
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Stickle Steam Specialties Co, 2217 Valley Ave, Indianapolis, Ind.
Straight Line Foundry & Machine Corp, 218 S Geddes St, Syracuse, N. Y.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, Ohio
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Andale Co, Philadelphia, Pa.
International Filter Co, 325 W 25th Place, Chicago, Ill.
Power Plant Specialty Co, 1390-440 S Dearborn St, Chicago, Ill.
Schutte & Koerting Co, 12th & Thompson Sts, Philadelphia, Pa.
Wright-Austin Co, Detroit, Mich.

Sylphon Controls

● for the automatic regulation of temperatures in water heating, processing, space heating, air conditioning and refrigeration.

FULTON Sylphon FOR TEMPERATURE CONTROL

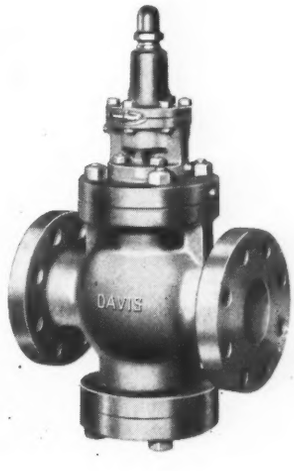
THE FULTON SYLPHON CO., Knoxville, Tenn.
Representatives in all principal cities



PRESSURE REGULATORS

THE Davis line of automatic pressure reducing valves is complete—there is a type and size available to fit any job whether it be on steam, air, gas, water, or oil. The line includes a full range of regulators suitable for dead end service as well as continuous flow. As the job dictates, you are free to choose between direct or pilot control . . . spring or weight loading . . . piston or diaphragm action. Standard sizes range from 3/8 in. to 24 in. for pressures up to 1500 lbs. Larger sizes available on special order.

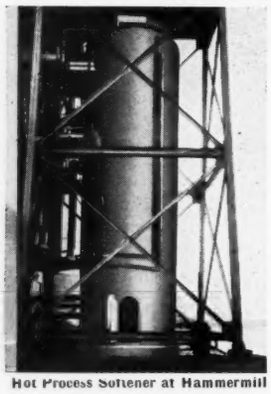
Bulletin No. 100-A describes and illustrates Davis pressure regulators for every purpose. Davis service and capacity charts accompany each bulletin requested, thus making it a simple matter to check the correct size and type of regulator for specific service and pressure conditions. Write for Bulletin No. 100-A.



DAVIS REGULATOR CO.

2540 SOUTH WASHTENAW AVENUE — CHICAGO, ILLINOIS

Cochrane Water Softeners



Hot Process Softener at Hammermill

COCHRANE has been identified with the conditioning of boiler feed water since the beginning of this century, and practically the entire development of the science of feed water softening has been tied in closely with Cochrane research and experience.

HOT PROCESS SOFTENING

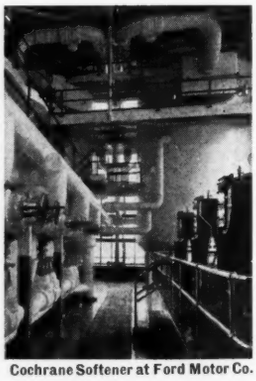
The method of water softening by the hot process was developed by Cochrane and every improvement since that time has been originated or perfected by the Cochrane engineering staff.

DEAERATING HOT PROCESS SOFTENER

By building the deaerator integral with the hot process softener Cochrane now offers a complete water conditioning plant in one piece of apparatus, combining clarification, softening, deaeration and storage in one unit.

ZEOLITE SOFTENERS

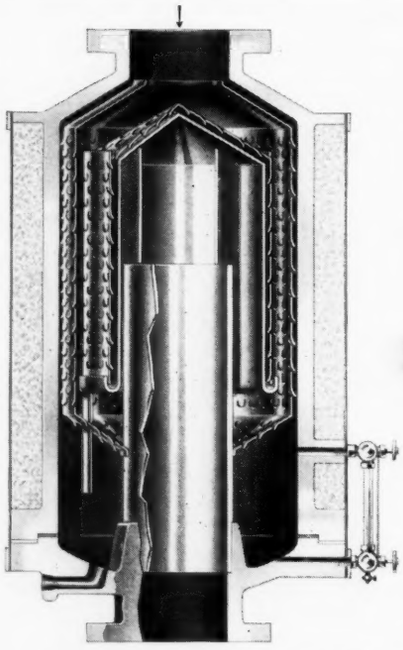
Cochrane offers Zeolite Water Softeners for all plants, large or small. All commonly known zeolite minerals can be furnished as well as the carbonaceous type. Write for catalog.



Cochrane Softener at Ford Motor Co.

COCHRANE CORP. 3106 N. 17th St. Philadelphia, Pa.

COCHRANE



FOR 45 YEARS SWEET'S DIRECT SEPARATORS

WRITE US FOR COMPLETE DATA

Made in various forms and metals to fit conditions.

The current of steam flows freely downward through an annular passage between perforated surfaces. Velocity next to perforated surfaces is slower than at center of annular passage, hence condensate moves into slower current next to perforations, and capillary action and gravity cause condensate and oil to pass through perforations. After passing through annular passage, the current reverses upwardly and remaining moisture is whipsnapped to water chamber by inertia and gravity.

STRAIGHT LINE FOUNDRY & MACHINE CORPORATION

Direct Separator Division **Syracuse, New York**

SEPARATORS, STEAM

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Centrifix Corp, Dept P, 3029 Prospect Ave, Cleveland, Ohio
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Elliott Co, Jeannette, Pa.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Homestead Valve Mfg Co, Box 210, Coraopolis, Pa.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kan.
Nicholson, W H, & Co, 125 Oregon St, Wilkes-Barre, Pa.
Stickle Steam Specialties Co, 2217 Valley Ave, Indianapolis, Ind.
Straight Line Foundry & Machine Co, 218 S Geddes St, Syracuse, N. Y.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Webster, Warren & Co, Camden, N. J.
Andale Co, Philadelphia, Pa.
Dri-Steam Valve Sales Corp, 70 E 45th St, New York, N. Y.
Hoppes Mfg Co, Belmont Ave, Springfield, Ohio
International Filter Co, 325 W 25th Place, Chicago, Ill.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
Plouff Co, Columbus Ave, Boston, Mass.
Power Plant Specialty Co, 1390-440 S Dearborn, Chicago, Ill.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.

SHEET PACKING

(See Packing, Sheet)

SHEETS, FIBRE

General Electric Co, Schenectady, N. Y.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Continental-Diamond Fibre Co, Newark, Del.
National Vulcanized Fibre Co, Wilmington, Del.
Wilmington Fibre Specialty Co, Wilmington, Del.

SHIMS

Laminated Shim Co, 21-60 44th Ave, Long Island City, N. Y.
Phoenix Specialty Mfg Co, 155 Wooster St, New York, N. Y.
Victor Mfg & Gasket Co, Roosevelt Rd, Chicago, Ill.

SIGNAL SYSTEMS, ELECTRIC

Bendix Aviation Corp, 754 Lexington Ave, Brooklyn, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.

SLUICING SYSTEMS, ASH

Allen-Sherman-Hoff Co, 227 S 15th St, Philadelphia, Pa.
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
United Conveyor Corp, Dearborn & Van Buren St, Chicago, Ill.

SLUSHING COMPOUNDS

(See Compounds)

SMOKE-DENSITY INDICATORS

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
McNeill, T W, Engrg Equipment Co, 4059 Van Buren St, Chicago Ill.
Photoswitch, Inc, 21 Chestnut St, Cambridge, Mass.

SMOKE INDICATORS, VISUAL

Diamond Power Specialty Co, Box 288 Detroit, Mich.
McNeill, T W, Engrg Equipment Co, 4059 Van Buren St, Chicago, Ill.

SKIP HOISTS

(See Hoists, Skip)

SLINGS, WIRE-ROPE

(See Rope, Wire)

SOCKETS, WIRE-ROPE

(See Rope, Wire)

SOFTENERS, WATER

American Sand-Banum Co, De[l] MP, 9 Rockefeller Plaza, Ne[w] York, N. Y.
Cochrane Corp, 3106 N 17th [S] Philadelphia, Pa.
Elgin Softener Corp, 55 Nor[th] St, Elgin, Ill.
Permutit Co, Dept A, 330 [W] 42nd St, New York, N. Y.
Scaife, Wm B, & Sons Co, Riv[er] & Ann St, Oakmont, Pa.
American Doucil Co, 121 S 3[d] St, Philadelphia, Pa.
American Water Softener [Co] 4th & Lehigh, Phila, Pa.
Chemical Solvent Co, Birmingham, Ala.
Filtrators Co, 96 Liberty [St] New York, N. Y.
Hungerford & Terry Inc, Clayton N. J.
International Filter Co, 325 [W] 25th Place, Chicago, Ill.
Power Plant Specialty Co, 1390-440 S Dearborn St, Chicago, Ill.

SOOT BLOWERS

(See Blowers, Soot)

SPEED INDICATORS

(See Tachometers)

SPRINKLER SYSTEMS, FIRE

Grinnell Co, Inc, 227 W Exchange St, Providence, R. I.
Central Automatic Sprinkler Co, Ashmead St, Phila, Pa.
Rockwood Sprinkler Co, 54 Harlow St, Worcester, Mass.

STACKS, STEEL

(See Also Chimneys)

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Brownell Co, 301 N Findlay St, Dayton, Ohio
Chicago Bridge & Iron Co, 2454 Old Colony Bldg, Chicago, Ill.
Combustion Engrg Co, Inc, 200 Madison Ave, New York, N. Y.
Connery Construction Co, 2nd & Luzerne Sts, Phila, Pa.
Graver Tank & Mfg Co, Inc, East Chicago, Ill.
Keeler, E, Co, Williamsport, Pa.
Murray Iron Works Company, Burlington, Iowa.
Prat-Daniel Corp, 80 S Water St, Port Chester, N. Y.
Alpha Tank & Sheet Metal Mfg Co, St. Louis, Mo.
Bass Foundry & Machine Co, Fort Wayne, Ind.
Bergen Point Iron Works, Bayonne, N. J.
Bigelow Co, 200-220 River St, New Haven, Conn.
Birchfield Boiler Inc, Tacoma, Wash.
Bos-Hatten, Inc, Buffalo, N. Y.
Bros, Wm, Boiler & Mfg Co, Minneapolis, Minn.
Burhorn, Edwin Co, 1 Newark St, Hoboken, N. J.
Caldwell, W E, Co 280 Brandeis St, Louisville, Ky.
Chattanooga Boiler & Tank Co, Box 110, Chattanooga, Tenn.
Colonial Iron Works Co, 17643 St. Clair Ave, Cleveland, Ohio
Dover Boiler Works, 90 E Dickerson St, Dover, N. J.
Downington Iron Works, Downington, Pa.
Drummond Mfg Co, Inc, Louisville, Ky.
International Engrg Works, Inc, Framingham, Mass.
Kirk & Blum Mfg Co, 2931 Spring Grove Ave, Cincinnati, O.
Kroeschell Boiler Co, Racine Wis.
Leader Iron Works, Inc, Decatur, Ill.
Littleford Bros, Cincinnati, O.
Lockport Engrg Works, Inc Lockport, N. Y.
Long, Walter, Mfg Co, Pittsburgh, Pa.
Mead-Penn Iron Works Co Meadville, Pa.
Mecklenburg Iron Works, P [O] Box 599, Charlotte, N. C.
Michelmann Steel Constructio Co, Quincy, Ill.

Milwaukee Boiler Mfg Co, Milwaukee, Wis.
Munroe, R, & Sons Mfg Corp, 23rd St, Pittsburgh, Pa.
New Bedford Boiler & Machine Co, New Bedford, Mass.
Ohio Machine & Boiler Co, Cleveland, Ohio
Oldman Boiler Works, Inc, Buffalo, N. Y.
Pennsylvania Boiler Works, Erie, Pa.
Petroleum Iron Works Co, Sharon, Pa.
Pittsburgh Des Moines Steel Co, Neville Id, Pittsburgh, Pa.
Quaker City Iron Works, Philadelphia, Pa.
Steacy-Schmidt Mfg Co, York, Pa.
Stover Steel Tank & Mfg Co, Freeport, Ill.
Titusville Iron Works Co, Titusville, Pa.
Treadwell, M H, Co, 140 Cedar St, New York, N. Y.
Union Boiler & Mfg Co, Lebanon, Pa.
Wickes Boiler Co, 512 N Water St Saginaw, Mich.
Young Bros, Co, Detroit, Mich.
Youngstown Steel Tank Co, Youngstown, Ohio

STEAM-JET CONVEYORS

(See Conveyors, Pneumatic, Steam-Jet)

STOKERS, OVERFEED

Canton Stoker Corp, 741 Andrew Place, Canton, O.
Flynn & Emrich Co, 300 Holliday St, Baltimore, Md.
Hoffman Combustion Engrg Co, 709 Marquette Bldg, Detroit, Mich.
Perfection Grate & Stoker Co, Springfield, Mass.
Whiting Corp, 15657 Lathrop Ave, Harvey, Ill.

STOKERS, SPREADER

Detroit Stoker Co, General Motors Bldg, Detroit, Mich.
Iron Fireman Mfg Co, 3295 W 106th St, Cleveland, Ohio
American Coal Burner Co, E Superior St, Chicago, Ill.
Continental Roll & Steel Foundry Co, East Chicago, Ind.
Hoffman Combustion Engrg Co, 709 Marquette Bldg, Detroit, Mich.

STOKERS, TRAVELING-GRATE

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Johnston & Jennings Co, 878 Addison Rd, Cleveland, Ohio
Laclede Stoker Co, 4440 Hunt Ave, St Louis, Mo.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Illinois Stoker Co, Alton, Ill.
McClave-Brooks Co, Scranton, Pa.

STOKERS, UNDERFEED, MULTIPLE-RETORT

American Engrg Co, Aramingo Ave, Philadelphia, Pa.
Combustion Engrg Co, Inc. 206 Madison Ave, New York, N. Y.
Detroit Stoker Co, General Motors Bldg, Detroit, Mich.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.

STOKERS, UNDERFEED, SINGLE-RETORT

Brownell Co, 301 N Findlay St, Dayton, Ohio
Canton Stoker Corp, 741 Andrew Place, Canton, Ohio
Combustioneer Div, Steel Products Engrg Corp, Springfield, Ohio
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Detroit Stoker Corp, General Motors Bldg, Detroit, Mich.
Flynn & Emrich Co, 300 Holliday St, Baltimore, Md.
Iron Fireman Mfg Co, 3295 W 106th St, Cleveland, Ohio

SIGNAL SYSTEMS, ELECTRIC

Graybar Everything Electrical Graybar Electric Company

One item of the Graybar 60,000. To fill every communication need Graybar offers Edwards Lokator, Webster Teletalk, Graybar Inter-Phone system and many other items including fire alarm equipment.

DISTRIBUTED BY

GraybaR ELECTRIC COMPANY

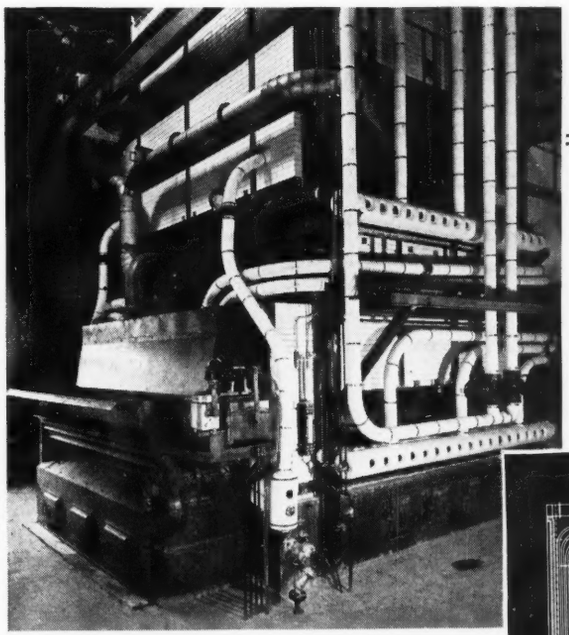
IN 83 PRINCIPAL CITIES

Canton STOKERS

- WORM TYPE UNDERFEED
- RAM TYPE UNDERFEED
- NATURAL DRAFT OVERFEED

Complete Engineering — Installation Service

CANTON STOKER CORP. Canton, Ohio



Furnace design and photograph show an industrial Laclede unit in service with no combustion arch and four water cooled walls. This unit operates at 80 000 pounds of steam per hour continuously burning Illinois screenings.

• • •

Laclede's long experience—with each installation engineered separately, assures 100% satisfaction on every job. Write for comp.ete information.

LACLEDE STOKERS

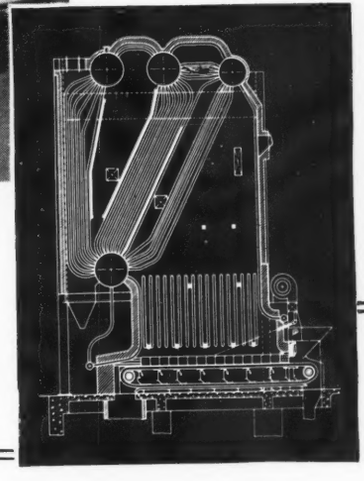
operate WITHOUT Arches

Laclede's experience — on numerous jobs now being operated without arches—definitely establishes the fact that it is unnecessary to use arches with chain grate stoker installations. Experience has also proved that all non-coking Bituminous Coals can be burned — in sizes down to 5/16" screenings — unwashed or washed — without fly ash troubles.

A Laclede stoker installation, with the elimination of arches, permits more radiant heat absorption by boiler with the following direct advantageous results:

. . . reduced flue gas temperature
. . . reduced furnace temperature
. . . reduced furnace maintenance

In addition a Laclede installation improves ignition by use of overfire air and eliminates smoke. Then, too, no cleaning of fires is required because ash is always automatically and continuously discharged from furnace as soon as combustible matter has been burned out.



Laclede Stokers without arches are applicable to all installations normally supplied with Bituminous Coals, under all load conditions. Installations of this type are now in service in completely water cooled furnaces, partially water cooled furnaces and refractory lined furnaces.

Forced draft stokers can be operated on natural draft in an emergency or on light loads. They are suitable for boiler sizes from 200 HP and larger up to capacities of 200,000 pounds of steam per hour.

LACLEDE STOKER CO.

4440 HUNT AVE. ST. LOUIS, MO.

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Bros, Wm, Boiler & Mfg Co, Nicollet Id, Minneapolis, Minn.
Conco Engrg Works, Mendota, Ill.
Fairbanks, Morse & Co, 600 S Michigan Ave, Chicago, Ill.
Frederick Iron & Steel Co, Frederick, Md.
Hoffman Combustion Engrg Co, 709 Marquette Bldg, Detroit, Mich.
Perfection Grate & Stoker Co, Springfield, Mass.

STORAGE SYSTEMS, COAL

Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Sauerman Bros, Inc, 462 S Clinton St, Chicago, Ill.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Chain Belt Co, 1674 W Bruce St, Milwaukee, Wis.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Hahn Engrg Co, 30 Church St, New York, N. Y.
Jeffrey Mfg Co, 932-99 N 4th St, Columbus, Ohio
Lidgerwood Mfg Co, Elizabeth, N. J.
United Conveyor Corp, Dearborn & Van Buren Sts, Chicago, Ill.

STRAINERS, GAS, AIR

Blackmer Pump Co, 2200 Century Ave, Grand Rapids, Mich.
Burgess Battery Co, 500 W Huron St, Chicago, Ill.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Aero Supply Mfg Co, Corry, Pa.
Andale Co, Philadelphia, Pa.
Cuno Engrg Corp, Meriden, Conn.
Kraissl Co, Hackensack, N. J.
Leslie Co, Lyndhurst, N. J.
Mueller Co, Decatur, Ill.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Tryco Products Inc, 1 Railroad Ave, Westfield, Mass.
Wright-Austin Co, Detroit, Mich.

STRAINERS, OIL

Anderson, V D, 1934 W 96th St, Cleveland, Ohio
Blackmer Pump Co, 2200 Century Ave, Grand Rapids, Mich.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Elliott Co, Jeannette, Pa.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
National Airoil Burner Co, 1327 Girard Ave, Phila, Pa.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Andale Co, Philadelphia, Pa.
Anthony Co, 47-33 5th St, Long Island City, N. Y.
Buffalo Meter Co, 2887 Main St, Buffalo, N. Y.
Chicago Flexible Shaft Co, Roosevelt Rd, Chicago, Ill.
Coen Co, 42 Boardman Place, San Francisco, Calif.
Cuno Engrg Corp, Meriden, Conn.
Foster Pump Works Inc, 50 Washington St, Brooklyn, N. Y.
Gaso Pump & Burner Mfg Co, Tulsa, Okla.
Kinney Mfg Co, Washington St, Boston, Mass.
Kraissl Co, Hackensack, N. J.
Leahy Mfg Co, Los Angeles, Cal.
Leslie Co, Lyndhurst, N. J.
Mahr Mfg Co, Minneapolis, Minn.
Monarch Mfg Works, 2731 E Westmoreland St, Phila, Pa.
Mueller Co, Decatur, Ill.
Newark Wire Cloth Co, 355-369 Verona Ave, Newark, N. J.
Nugent, Wm W, & Co, Inc, 402 N Hermitage Ave, Chicago, Ill.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Spence Engrg Co, Inc, 61 Grand St, Walden, N. Y.
Staples & Pfeiffer Ltd, San Francisco, Calif.
Wright-Austin Co, Detroit Mich.

STRAINERS, STEAM

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Anderson, V D, Co, 1934 W 96th St, Cleveland, Ohio
Cash, A W, Co, 402 N Eldorado Sts, Decatur, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Eddington Metal Specialty Co, Box K, Eddington, Pa.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, Ohio
Andale Co, Philadelphia, Pa.
Atwood & Morrill Co, Salem, Mass.
Carling Turbine Blower Co, 25 St. John's Rd, Worcester, Mass.
Cashin, W D, Co, 69 A St, Boston, Mass.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
Leahy Mfg Co, Los Angeles, Cal.
Leslie Co, Lyndhurst, N. J.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
Mueller Co, Decatur, Ill.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Tryco Products Inc, 1 Railroad Ave, Westfield, Mass.
Wright-Austin Co, Detroit, Mich.

STRAINERS, WATER

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Anderson, V D, 1934 W 96th St, Cleveland, Ohio
Blackmer Pump Co, 2200 Century Ave, Grand Rapids, Mich.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Eddington Metal Specialty Co, Box K, Eddington, Pa.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Elliott Co, Jeannette, Pa.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Andale Co, Philadelphia, Pa.
Anthony Co, 47–33 5th St, Long Island City, N. Y.
Atwood & Morrill Co, Sale Mass.
Barrett, Haentjens & Co, Haz ton, Pa.
Buffalo Meter Co, 2887 Main Buffalo, N. Y.
Cashin, W D, Co, 69 A St, Bo ton, Mass.
Cuno Engrg Corp, Merid Conn.
Dunham, C A, Co, Chicago,
Foster Pump Works, Inc, Washington St, Brookly N. Y.
Kieley & Mueller Inc, 40 W 1 St, New York, N. Y.
Kinney Mfg Co, Washington Boston, Mass.
Kraissl Co, Hackensack, N.
Leslie Co, Lyndhurst, N. J.
Marsh, Jas P, Corp, 2049 Sou port Ave, Chicago, Ill.
Monarch Mfg Works, 2731 Westmoreland St, Phila, P
Schade Valve Mfg Co, N Bodi St, Philadelphia, Pa.
Schutte & Koerting Co, 12th Thompson Sts, Phila, Pa.
Spence Engrg Co, Inc, 61 Gra St, Walden, N. Y.
Spray Engrg Co, 111 Centra St, Somerville, Mass.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Trane Co, 2012 Cameron Av La Crosse, Wis.
Tryco Products Inc, 1 Railroad Ave, Westfield, Mass.
Wright-Austin Co, Detroit, Mich.

SUPERHEATERS

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Combustion Engrg Co, Inc, 200 Madison Ave, New York, N. Y.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kan.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Superheat Control Corp, 422 Dime Bank Bldg, Detroit, Mich.

SWITCHBOARDS

Allis-Chalmers Mfg Co, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Troy Engine & Machine Co, 142 Railroad Ave, Troy, Pa.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Adam, Frank, Electric Co, St. Louis, Mo.
Allen-Bradley Co, Milwaukee, Wis.
Continental Diamond Fibre Co, Newark, Del.
Hanson-Van Winkle - Munning Co, Matewan, N. J.
I-T-E Circuit Breaker Co, 19th & Hamilton Sts, Phila, Pa.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.
Square D Co, Rivard & Piquette Sts, Detroit, Mich.

SWITCHES, ELECTRIC

(See Also, Breakers, Circuit)
Allis-Chalmers Mfg Co, Milwaukee, Wis.
Cutler-Hammer, Inc, 606 N 12th St, Milwaukee, Wis.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Monitor Controller Co, Baltimore, Md.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Adam, Frank, Electric Co, St. Louis, Mo.
Allen-Bradley Co, Milwaukee, Wis.
Arrow-Hart & Hegeman Elect Co, 105 Hawthorn, Hartford, Conn.
Automatic Switch Co, 41 E 11th St, New York, N. Y.
Bryant Electric Co, Bridgeport, Conn.
Clark Controller Co, Cleveland, Ohio
Colt's Patent Fire Arms Mfg Co, Hartford, Conn.
I-T-E Circuit Breaker Co, 19th & Hamilton Sts, Phila, Pa.
Penn Electric Switch Co, Goshen, Ind.

SUPERHEAT CONTROL CORPORATION
successor to
CONTROLLED HEAT EQUIPMENT CO.
offers . . .
The only positively controlled Water-Regulated Superheater, featuring forced circulation.
● The only superheater that gives guaranteed accurate operation at any boiler rating and can be installed in your present boiler without changing tubes or setting.
422 Dime Bank Building, Detroit, Michigan

SWITCHES
Everything Electrical
GraybaR QUALITY ELECTRIC COMPANY

One Item of the Graybar 60,000
Indoor switches and outdoor switches. Switches for every power, light and signaling need.
DISTRIBUTED BY
GraybaR ELECTRIC COMPANY
IN 83 PRINCIPAL CITIES

R ller-Smith Co, 1766 West Market St, Bethlehem, Pa.
S weitzer & Conrad, 4433 N Ravenswood Ave, Chicago, Ill.
S uare D Co, Rivard & Piquette Sts, Detroit, Mich.

S NCHRONIZERS AUTOMATIC

B rlington Instrument Corp, 301 N Main St, Burlington, Iowa
E ctric Machinery Mfg Co, 1331 Tyler St, N E, Minneapolis, Minn.

SYNCHROSCOPES

Burlington Instrument Corp, 301 N Main St, Burlington, Iowa
General Electric Co, Schenectady, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.

TACHOMETERS

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Biddle, Jas G, Co, 1211-13 Arch St, Philadelphia, Pa.
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
General Electric Co, Schenectady, N. Y.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Zernickow, O, Co, 21 Park Row, New York, N. Y.
Bristol Co, Waterbury, Conn.
Coats Machine Tool Co, 108 W 40th St, New York, N. Y.
Esterline-Angus Co, Box 596, Indianapolis, Ind.
Scherr, George, Co, 126 Lafayette St, New York, N. Y.

TANKS, CAST-IRON

Brady Conveyors Corp, 20 W Jackson Blvd, Chicago, Ill.
Hahn Engrg Co, 30 Church St, New York, N. Y.
Meehanite Corp, Pittsburgh, Pa.
National Conveyors Co, 50 Church St, New York, N. Y.
United Conveyor Corp, Dearborn & Van Buren Sts, Chicago, Ill.

TANKS, ICE

Chicago Bridge & Iron Co, 2454 Old Colony Bldg, Chicago, Ill.
Frick Co, 325 Broadway, Waynesboro, Pa.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Baker Ice Machine Co, Inc, Omaha, Neb.
Burhorn, Edwin, Co, 1 Newark St, Hoboken, N. J.
Caldwell, W E, Co, Inc, 280 Brandeis St, Louisville, Ky.
Downingtown Iron Works, Downingtown, Pa.
Haveg Corp, Newark, Del.
Quaker City Iron Works, Aramingo Ave, Philadelphia, Pa.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

TANKS, STEEL

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Brownell Co, 301 N Findlay St, Dayton, Ohio
Chicago Bridge & Iron Co, 2454 Old Colony Bldg, Chicago, Ill.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Connery Construction Co, 2nd & Luzerne Sts, Phila, Pa.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Graver Tank & Mfg Co, Inc, East Chicago, Ill.
Jones & Laughlin Steel Corp, Pittsburgh, Pa.
Murray Iron Works Co, Burlington, Iowa.
Naife, Wm B, & Sons Co, 1st & Ann Sts, Oakmont, Pa.
Straight Line Foundry & Machine Co, 218 S Geddes St, Syracuse, N. Y.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Alco Products Div, 36 Church St, New York, N. Y.
Alliance Tank Co, Alliance, O.
Alpha Tank & Sheet Metal Mfg Co, St Louis, Mo.
American Welding Co, 30 Church St, New York, N. Y.
Bass Foundry & Machine Co, Fort Wayne, Ind.
Bigelow Co, 200-220 River St, New Haven, Conn.
Birchfield Boiler Inc, Tacoma, Wash.
Black Sivalls & Bryson, Inc, Oklahoma City, Okla.
Blaw-Knox Co, Pittsburgh, Pa.
Bos-Hatten, Inc, Buffalo, N. Y.
Burhorn, Edwin Co, 1 Newark St, Hoboken, N. J.
Caldwell, W E, Co, Inc, 280 Brandeis St, Louisville, Ky.
Chattanooga Boiler & Tank Co, Box 110, Chattanooga, Tenn.
Colonial Iron Works Co, 17643 St. Clair Ave, Cleveland, Ohio
Dover Boiler Works, 90 E Dickerson St, Dover, N. J.
Farrar & Trefts, Inc, Buffalo, N. Y.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Hauser-Stander Tank Co, Cincinnati, Ohio
International Engrg Works, Inc, Framingham, Mass.
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, O.
Koppers Co, Pittsburgh, Pa.
Littleford Bros, 457 E Pearl St, Cincinnati, Ohio
Mecklenburg Iron Works, P. O. Box 599, Charlotte, N. C.
Munroe, R, & Sons Mfg Corp, 23rd St, Pittsburgh, Pa.
National Conveyors Co, 50 Church St, New York, N. Y.
Quaker City Iron Works, Aramingo Ave, Philadelphia, Pa.
Stover Steel Tank & Mfg Co, Freeport, Ill.
Titusville Iron Works Co, Titusville, Pa.
Treadwell, M H, Co, 140 Cedar St, New York, N. Y.
Wickes Boiler Co, 512 N Water St, Saginaw, Mich.
Young & Bertke Co, 1040 W Hulbert Ave, Cincinnati, Ohio
Youngstown Steel Tank Co, Youngstown, Ohio

TANKS, WOOD

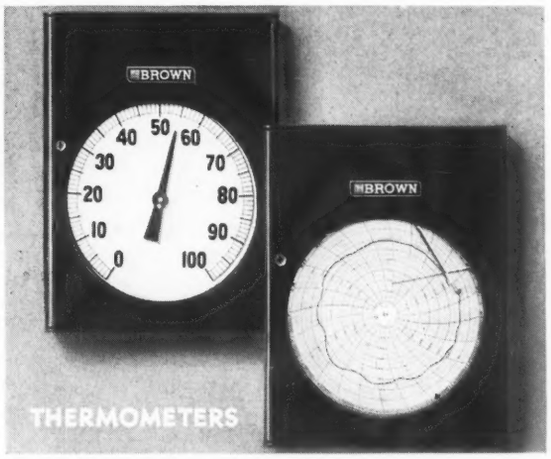
Black Sivalls & Bryson, Inc, Oklahoma City, Okla.
Caldwell, W E, Co, Inc, 280 Brandeis St, Louisville, Ky.
Challenge Co, Batavia, Ill.
Drummond Mfg Co, Inc, Louisville, Ky.
Dunck Tank Works Inc, Milwaukee, Wis.
Hauser-Stander Tank Co, Cincinnati, Ohio
National Tank & Pipe Co, Portland, Ore.
Kalamazoo Tank & Silo Co, Kalamazoo, Mich.
National Tank Co, Tulsa, Okla.
New England Tank & Tower Co, Everett, Mass.
Peter Pfeil Cooperage Works, Buffalo, N. Y.

THERMOMETERS, GLASS

Taylor Instrument Cos, Rochester, N. Y.
Bristol Co, Waterbury, Conn.
Manning, Maxwell & Moore, Inc, Bridgeport, Conn.
Moeller Instrument Co, 132-02 89th Ave, Richmond Hill, N. Y.
Nurnberg Thermometer Co, 401 Bridge St, Brooklyn, N. Y.
Palmer Co, 2501-A Norwood Ave, Cincinnati, Ohio
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.
Wagner, Carl H, & Son, N Albany Ave, Chicago, Ill.

THERMOMETERS, INDICATING, RECORDING

Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.



For Controlling, Recording and Indicating Temperatures from —40 to +1200°F.

A pressure type, remote bulb type thermometer, consisting of instrument, bulb and connecting tubing completely assembled as one unit. Can be furnished with connecting tubing lengths up to 200 feet.

Charts and scales for a wide variety of ranges are available, from a minimum temperature span of 75°F to a maximum span of 1200°F. Corresponding Centigrade scales and charts are also available.

Controllers and recorders furnished in two sizes, one with a 12" diameter chart and the other with a 10" diameter chart. Indicators are equipped with a 7½" eccentric scale. Three kinds of thermal systems are available: vapor-filled, gas-filled, and mercury-filled.

Thermal systems, bulbs, sockets and connecting tubing can be furnished in various styles and material to meet the requirements of each individual job.

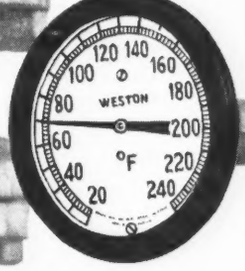
Write for Catalog 2-17. THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4490 Wayne Avenue, Philadelphia, Pa.

BROWN THERMOMETERS AND PRESSURE GAUGES

Accurate Measurement with Simplicity

READABLE, RUGGED

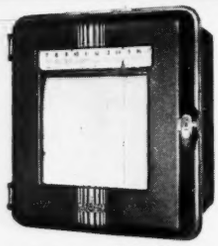
ALL-METAL THERMOMETERS



No need to walk or climb "close-up" to a WESTON Thermometer to get your reading. The large, gauge-type dial is always in plain view... easily read from a distance... even on overhead lines or other "hard to get at" places. *They save steps, save time, insure accurate reading.* In addition, their rigid, "all-metal" construction keeps breakage at a minimum, and eliminates damage from overloads. Write for bulletin T5. Weston Electrical Instrument Corporation, 679 Frelinghuysen Ave., Newark, N. J.

WESTON ALL-METAL THERMOMETERS

THERMOMETERS



Micromax Strip-Chart Temperature Recorder

ELECTRICAL INDICATORS AND RECORDERS

These Micromax balance-type instruments are sturdy, motor-driven machines which indicate, record and control temperature. Supplied either as strip-chart or round-chart instruments, they draw inked records, have bold indicating scales. They measure temperature of steam, water, flue gas. generator windings and bearings.

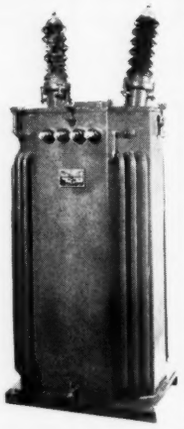
LEEDS & NORTHRUP COMPANY
4987 Stenton Avenue, Philadelphia, Pa.

LEEDS & NORTHRUP

NIAGARA TRANSFORMERS

Oil and Air Cooled
5 to 1000 K.V.A.
All Voltages and Cycles

We still have a few territories open for agents



ERIE ELECTRIC CO.
112 Church St. Buffalo, N. Y.

Algae Control

for Cooling Towers, Ponds, Condensers, etc.

IT WILL pay you to get in touch with a Nalco engineer if you are interested in Algae control.

NATIONAL ALUMINATE CORPORATION,
6222 W. 66th Place, Chicago, Ill.

THE Nalco SYSTEM OF WATER TREATMENT

Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Foxboro Co, 38 Neponset Ave, Foxboro, Mass.
Johnson Service Co, 509 E Michigan St, Milwaukee, Wis.
Leeds & Northrup Co, 4970 Stenton Ave, Philadelphia, Pa.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Taylor Instrument Cos, Rochester, N. Y.
U. S. Gauge Co, 44 Beaver St, New York, N. Y.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Bristol Co, Waterbury, Conn.
Engelhard, Charles, Inc, 234 NJRR Ave, Newark, N. J.
Friez, Julien P, & Sons Inc, 4 N Central Ave, Baltimore, Md.
Manning, Maxwell & Moore, Inc, Bridgeport, Conn.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
Moeller Instrument Co, 132-02 89th Ave, Richmond Hill, N. Y.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.
Wagner, Carl H, & Son, N Albany Ave, Chicago, Ill.

THERMOSTATIC VALVES

(See Valves, Thermostatic)

THERMOSTATS, ELECTRIC

Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Fulton Sylphon Co, Knoxville, Tenn.
Johnson Service Co, 509 E Michigan St, Milwaukee, Wis.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Taylor Instrument Cos, Rochester, N. Y.
American Radiator Co, 40 W 40th St, New York, N. Y.
Bristol Co, Waterbury, Conn.
Burling Instrument Co, 2 Belmont Ave, Newark, N. J.
Fenwal, Inc, 100 Main St, Ashland, Mass.
General Controls Co, 267 5th Ave, New York, N. Y.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Minneapolis - Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.

TOWERS, COOLING

Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Marley Co, Fairfax Rd & Marley Ave, Kansas City, Kans.
Murray, D J, Mfg Co, Wausau, Wis.
Binks Mfg Co, 3114-40 Carroll Ave, Chicago, Ill.
Braun, C F, & Co, 1000 S Fremont Ave, Alhambra, Calif.
Burhorn, Edwin, Co, 1 Newark St, Hoboken, N. J.
Fluor Corp, Los Angeles, Calif.
Lilie-Hoffman Cooling Towers, 4239 Duncan Ave, St. Louis, Mo.
Lummus Co, 420 Lexington Ave, New York, N. Y.
Schubert-Christy Corp, 1600 Georgia St, Affton Station, St. Louis, Mo.
Wheeler, C H, Mfg Co, Lehigh & Sedgley Aves, Phila, Pa.

TRANSFORMERS, ELECTRIC

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Erie Electric Co, 124 Church St, Buffalo, N. Y.
General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Forbes & Myers, 174 Union Worcester, Mass.
Roller-Smith Co, 1766 Market St, Bethlehem, Pa.
Wagner Electric Corp, Louis, Mo.

TRANSMISSIONS, VARIABLE SPEED

American Blower Co, 6[illegible] Russell St, Detroit, Mich.
American Engrg Co, Amari[illegible] Ave, Philadelphia, Pa.
Electric Machinery Mfg [illegible] 1331 Tyler St, N E, Min[illegible] apolis, Minn.
Oilgear Co, 1421 W Bruce [illegible] Milwaukee, Wis.
Vickers, Inc, Detroit, Mich.
Waterbury Tool Co, Waterbu[illegible] Conn.

TRANSMISSIONS, VARIABLE SPEED

Allis-Chalmers Mfg Co, M[illegible] waukee, Wis.
Electric Machinery Mfg Co, 1[illegible] Tyler St, N E, Minneapolis, Minn.
Link-Belt Co, 307 N Michigan Ave, Chicago, Ill.
Morse Chain Co, Ithaca, N. Y.
Reeves Pulley Co, 100 N Reed St, Columbus, Ind.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Columbia Vari-Speed Co, 137 Liberty Drive, Wheaton, Ill.
Graham Transmissions, Inc, Milwaukee, Wis.
Equipment Engrg Co, 2853 Columbus Ave, Minneapolis, Minn.
Ideal Commutator Dresser Co, 1025 Park Ave, Sycamore, Ill.
Janette Mfg Co, 556 West Monroe St, Chicago, Ill.
Lenney Machine & Mfg Co, Warren, Ohio
Lewellen Mfg Co, Maple Ave, Columbus, Ind.
Moore & White Co, Philadelphia, Pa.
Sterling Electric Motors, Inc, Los Angeles, Calif.
U. S. Electrical Motors, 200 E Slauson Ave, Los Angeles, Cal.

TRAPS, COMPRESSED-AIR

(See Also Strainers)

Armstrong Machine Works, 812 Maple St, Three Rivers, Wis.
Nicholson, W H, & Co, 125 Oregon St, Wilkes-Barre, Pa.
Squires, C E, Co, 40th St & Kelley Ave, Cleveland, Ohio
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, Ohio
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Keckley, C C, Co, Chicago, Ill.
McAuley Trap Co, Dept 702, 405 Penn Ave, Pittsburgh, Pa.
Morehead Mfg Co, Detroit, Mich.

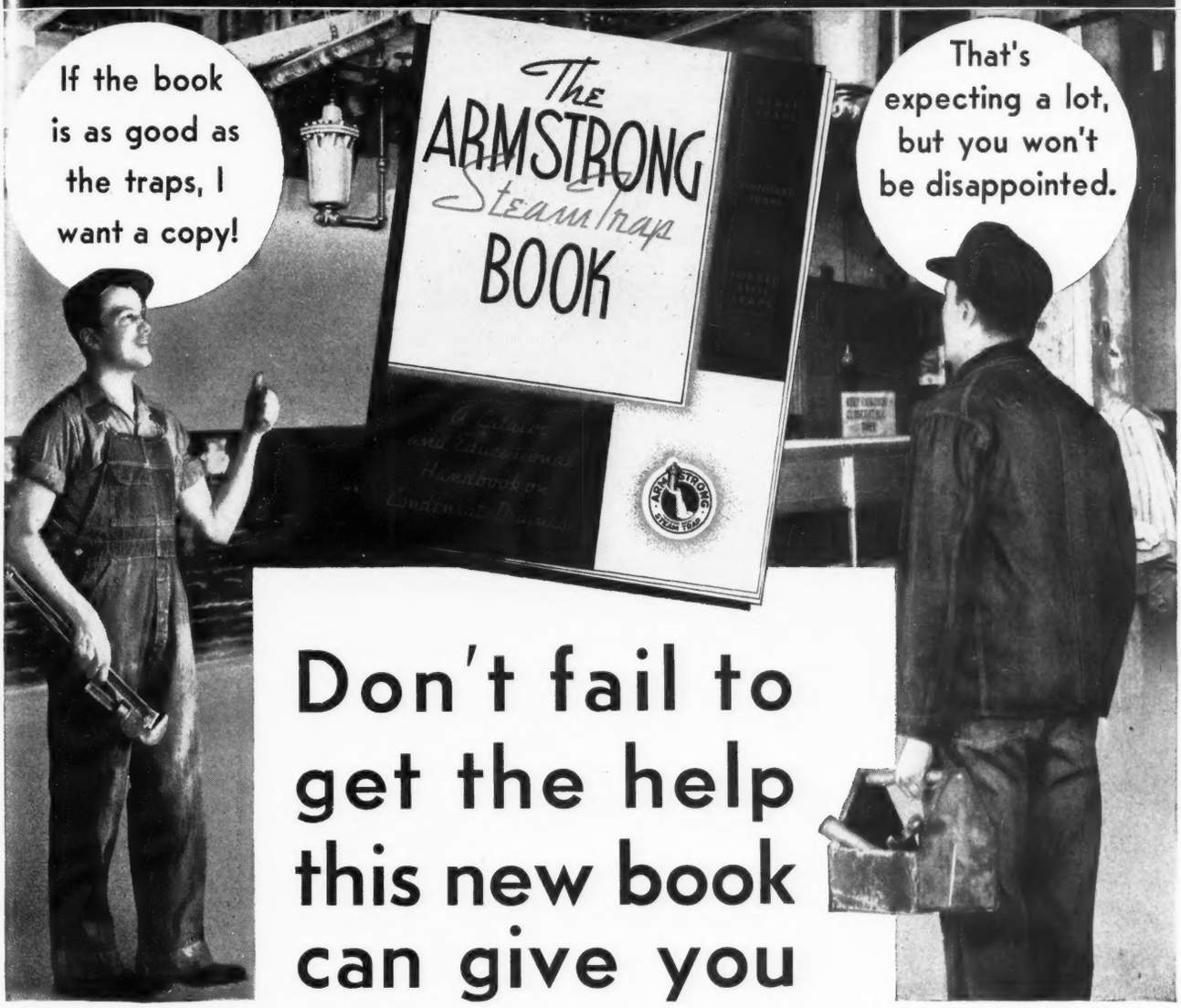
TRAPS, RETURN

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Hoffman Specialty Co, Inc, Waterbury, Conn.
Stickle Steam Specialties Co, 2217 Valley Ave, Indianapolis, Ind.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Cashin, W D, Co, 69 A St, Boston, Mass.
d'Este, Julian Co, 6 Spice St, Charlestown, Mass.
Dunham, C A, Co, E Ohio St, Chicago, Ill.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
Templeton Bros, Inc, 189 Belgrade Ave, Roslindale, Mass.

TRAPS, STEAM

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Anderson, V D, Co, 1934 W 96th St, Cleveland, Ohio
Armstrong Machine Works, 812 Maple St, Three Rivers, Mich.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.

Modernize Your Trapping Now!


If the book is as good as the traps, I want a copy!
The ARMSTRONG Steam Trap BOOK
That's expecting a lot, but you won't be disappointed.

Don't fail to get the help this new book can give you

GOOD TRAPPING PAYS! And now with the aid of the new Armstrong Steam Trap Book, it is easy to get good trapping for every job. This 36-page large size handbook is a veritable encyclopedia of useful information about condensate drainage, heating, pipe sizes, hook-ups, traps, etc. Profusely illustrated with photographs and diagrams and sprinkled with charts and tables, it makes a handy reference volume that every engineer will want for his library.

Copies may be obtained without obligation from your local Armstrong Representative, or write ARMSTRONG MACHINE WORKS, 812 Maple St., Three Rivers, Mich.

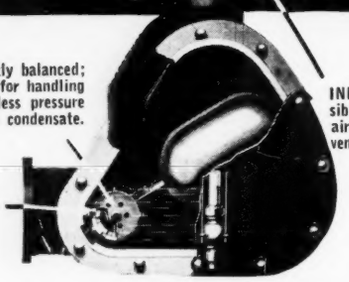
ARMSTRONG REPRESENTATIVES

Atlanta, Ga., J. M. Tull Metal & Supply Co., Inc.
Baltimore, Md., Milby & McKinney, 116 Light St.
Birmingham, Ala., Southeastern Products Co.
Boston, Mass., Files Steam Specialty Co.
Buffalo, N. Y., Herr Steam Specialty Co.
Charleston, W. Va., Baldwin Supply Co.
Chicago, Ill., Barrett-Christie Co.
Dallas, Texas, Geo. B. Allan & Co.
Denver, Hendrie-Bolthoff Mfg. & Supply Co.
Des Moines, Ia., E. B. Carr, 307 Securities Bldg.
Detroit, Mich., A. F. Squier, 2910 National Ave.
Duluth, Minn., John E. Smith, 1720 W. Superior Street
Erie, Pa., Coblentz Equipment Co.
Evansville, Ind., Evansville Supply Co.
Fond du Lac, Wis., A. N. Goff
Honolulu, T. H., The von Hamm-Young Company, Ltd.
Indianapolis, Ind., Ind. Belting & Supply Co.
Kansas City, Mo., Hughes Machinery Co.
Knoxville, Tenn., Leinart Engineering Co.
Los Angeles, Guy L. Warden, 114 W. 17th St.
Louisville, Ky., Graft-Pelle Co.
Memphis, Tenn., The Power Equipment Co.
Milwaukee, Wis., Hamacher & Williams
Minneapolis, Minn., Albert C. Price Co.
Montreal, Quebec, Preston, Phipps Inc.
New Orleans, La., Louisiana Steam Equipment Co.
New York, N. Y., Advance Engineering Co.
Philadelphia, Pa., Brogan & Co.
Phoenix, Ariz., John W. Ladlow
Pittsburgh, Pa., R. S. Eastman Co.
Portland, Oregon, Arthur Forsyth Co., 927 S. W. Oak St.
Richmond, Va., Allan T. Shepherd Company, 411-12 Tenth St. Bldg.
St. Louis, Mo., O'Brien Equipment Co.
Salt Lake City, Utah, Lee, Pace & Turpin
San Francisco, Calif., Refrigerating & Power Specialties Co.
Seattle, Arthur Forsyth Co., 500 First Ave., South
South Bend, Ind., Smith-Monroe Co.
Syracuse, N. Y., Hopton Company, 321 Denison Building
Tampa, Florida, G. W. Neale
Toronto 5, Ont., Arthur S. Leitch Co., Ltd.
Vancouver, B. C., General Equipment Ltd.
Winnipeg, Man., Kipp-Kelly, Ltd.
Wooster, Ohio, Steam Economies Co.

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Hoffman Specialty Co, Inc, Waterbury, Conn.
Nicholson, W H, & Co, 125 Oregon St, Wilkes-Barre, Pa.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Squires, C E, Co, E 40th St & Kelley Ave, Cleveland, O.
Stickle Steam Specialties Co, 2217 Valley Ave, Indianapolis, Ind.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Webster, Warren, & Co, Camden, N. J.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.

Atwood & Morrill Co, Salem, Mass.
Cashin, W D, Co, 69 A St, Boston, Mass.
Coe Mfg Co, Painesville, Ohio
Davis Engrg Corp, 1064–16 E Grand St, Elizabeth, N. J.
d'Este, Julian Co, 6 Spice St, Charlestown, Mass.
Dunham, C A, Co, E Ohio St, Chicago, Ill.
Illinois Engrg Co, Chicago, Ill.
Justus Steam Trap Co, Box 26, Napanoch, N. Y.
Kaye & MacDonald, 91 Franklin Ave, West Orange, N. J.
Keckley, C C, Co, Chicago, Ill.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
Kitts Steam Specialty Co, 272 W 2nd St, Oswego, N. Y.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
McAuley Trap Co, Dept 702, 405 Penn Ave, Pittsburgh, Pa.

Extraordinary Discharge Capacity


VALVE: Perfectly balanced; has large ports for handling water rapidly; less pressure needed to expel condensate.
INLET AT TOP: No possibility of trap becoming air-bound; deflector prevents entering water from striking float.
VALVE SEAT Sleeve has longitudinal ports. No stuffing box to leak.

MULTIPORT DRAINER

The Cochrane Multiport Drainer is a low pressure trap, especially suited for operations at low differential pressures and where large quantities of condensate must be handled instantly and continuously. Five sizes, constructed of suitable materials to withstand various operating conditions to 200 lb. working pressure and 750°, keep down first cost for lower pressure applications. Cochrane's is a complete line.

Write for bulletin 2925 containing capacity charts and price lists of drainers to meet your specifications. Cochrane Corporation, 3106 N. 17th St., Philadelphia, Pa.

Also manufacturers of Separators, Dischargers, Multiport Relief Valves, Blow-Off Valves, etc.

COCHRANE

Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Plouff Co, Columbus Ave, Boston, Mass.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Tagliabue, C J, Mfg Co, Park & Nostrand Aves, Brooklyn, N. Y.
Watson & McDaniel Co, 441 N Marshall St, Phila, Pa.
Williams Gauge Co, 1938 Penna. Ave, N S, Pittsburgh, Pa.
Wright-Austin Co, Detroit, Mich.

TREADS, LADDER AND STAIR

Arrowhead Iron Works, 431 W 5th St, Kansas City, Mo.
Carborundum Co, Dept P, Perth Amboy, N. J.
American Abrasive Metals Co, Irvington, N. J.
Blaw-Knox Co, Pittsburgh, Pa.
Diamond Mfg Co, Wyoming, Pa.
Hendrick Mfg Co, Carbondale, Pa.
Irving Subway Grating Co, 50–09 27th St, Long Island City, N. Y.
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, O.
Klemp, Wm F, Co, S Melvina Ave, Chicago, Ill.
Norton Co, Worcester, Mass.
Tri-Lok Co, Pittsburgh, Pa.
Universal Safety Tread, Inc, Lowell, Mass.

TUBES, BOILER, SUPERHEATER

Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Boiler Tube Co of America, 3126 Preble Ave, Pittsburgh, Pa.
Globe Steel Tubes Co, 4051 W Burnham St, Milwaukee, Wis.
Jones & Laughlin Steel Co, Pittsburgh, Pa.
National Tube Co, Pittsburgh, Pa.
Steel & Tubes Div, 218 E 131st St, Cleveland, Ohio
Timken Roller Bearing Co, Canton, Ohio
Allegheny Ludlum Steel Corp, Pittsburgh, Pa.
Detroit Seamless Steel Tubes Co,
Lockport Engrg Works, Inc, Lockport, N. Y.
Ohio Seamless Tube Co, Shelby, Ohio
Pittsburgh Pipe Coil & Bending Co, Pittsburgh, Pa.
Wheeling Steel Co, Wheeling, W. Va.

TUBES, CONDENSER

American Brass Co, Waterbury, Conn.
Chase Brass & Copper Co, 236 Grand St, Waterbury, Conn.
Globe Steel Tubes Co, 4051 W Burnham St, Milwaukee, Wis.
Scovill Mfg Co, 99 Mill St, Waterbury, Conn.
Bridgeport Brass Co, 774 E Main St, Bridgeport, Conn.
Phelps Dodge Copper Products Corp, 40 Wall St, New York, N. Y.
Revere Copper & Brass Co, 230 Park Ave, New York, N. Y.
Wolverine Tube Co, Detroit, Mich.

TUBES, PITOT

American Blower Corp, 90 Russell St, Detroit, Mich
Bacharach Ind Instrument Co, 7000 Bennett, Pittsburgh, Pa.
Ellison Draft Gage Co, 21 W Kinzie St, Chicago, Ill.

TUBING, GLASS

Corning Glass Works, Dept P, Corning, N. Y.
Fischer & Porter Co, 61 W Penn St, Germantown, Phila, Pa.

TUBING, METAL, FLEXIBL

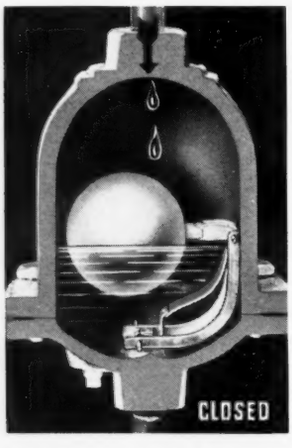
American Metal Hose Branch of American Brass Co. Waterbury, Conn.
Chicago Metal Hose Corp, 312 S 3rd Ave, Maywood, Ill
Atlantic Metal Hose Co, 12 W 64th St, New York, N. Y.
Federal Metal Hose Corp, Buffalo, N. Y.
Fischer, Charles, Spring Co, 240 Kent Ave, Brooklyn, N. Y.
Mulconroy Co, 54th & Jefferson Sts, Philadelphia, Pa.
National Electric Products Corp, Pittsburgh, Pa.
Pennsylvania Flexible Metallic Tubing Co, Phila, Pa.
Seamlex Co, 5–21 48th Ave, Long Island City, N. Y.
Titeflex Metal Hose Co, Frelinghuysen Ave, Newark, N. J.
United Metal Hose Co, 3601 43rd Ave, Long Island City, N. Y.

TURBINES, HYDRAULIC

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Baldwin-Southwark Corp, Philadelphia, Pa.
Holyoke Machine Co, Holyoke, Mass.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, Ohio
Newport News Shipbuilding and Dry Dock Co, Newport News, Va.
Pelton Water Wheel Co, San Francisco, Calif.
Smith, S Morgan, Co. 500 Lincoln St, York, Pa.

TURBINES, STEAM

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Coppus Engrg Corp, 350 Park Ave, Worcester, Pa.
De Laval Steam Turbine Co, Trenton, N. J.
Elliott Co, Jeannette, Pa.
General Electric Co, Schenectady, N. Y.
Moore Steam Turbine Corp, 37 Coats St, Wellsville, N. Y.
Murray Iron Works Co, Burlington, Iowa
Terry Steam Turbine Co, Box 1200, Hartford, Conn.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Worthington Pump & Machinery Corp, Harrison, N. J.



NEW! A real "Snap-Action" Air Trap

IF you use any compressed air in your plant, it is better than an even bet that your maintenance department will thank you for calling their attention to the new Armstrong "Snap-Action" Air Trap. Now, for the first time, it combines all the requisites for satisfactory service in one trap:

1. IMMUNITY TO ORDINARY DIRT TROUBLES. Pays for itself by reducing your maintenance expenses.

2. OPERATES WITHOUT AIR LOSS. Guards against excessive power costs.

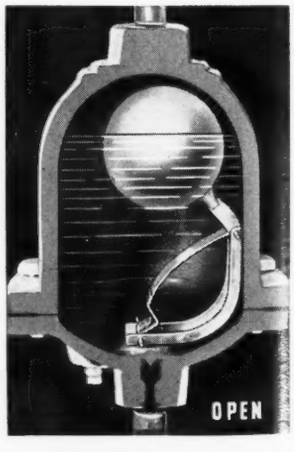
3. SELF-PRIMING. Completely automatic.

4. LARGE CAPACITY. 1400 lbs. of water per hour at 125 lbs. pressure—1000 at 250 lbs.

5. HIGH QUALITY CONSTRUCTION. Heat treated valve, stainless steel trim.

We will mail interesting illustrated bulletin to you without obligation.

ARMSTRONG MACHINE WORKS
812 Maple St.,
Three Rivers, Mich.



Carling Turbine Blower Co, 25 St John's Rd, Worcester, Mass.
Dean Hill Pump Co, Anderson, Ind.

TURBOBLOWERS

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Connous Engrg Corp, 350 Park Ave, Worcester, Mass.
De Laval Steam Turbine Co, Trenton, N. J.
Elliott Co, Jeannette, Pa.
Ingersoll-Rand Co, 11 Broadway, New York, N. Y.
Moore Steam Turbine Corp, 37 Coats St, Wellsville, N. Y.
Worthington Pump & Machinery Corp, Harrison, N. J.
Allen Billmyre Corp, Daily News Bldg, New York, N. Y.
Carling Turbine Blower Co, 25 St John's Rd, Worcester, Mass.
Power Turbo-Blower Co, 30 Vesey St, New York, N. Y.
Roots-Connersville Blower Corp, Connersville, Ind.
Spencer Turbine Co, 488 New Park Ave, Hartford, Conn.
Wing, L J, Mfg Co, W 14th St & 7th Ave, New York, N. Y.

UNDERGROUND STEAM CONDUIT

American District Steam Co, 70 Bryant St, N Tonawanda, N. Y.
Porter, H W, & Co, 827-P Frelinghuysen Ave, Newark, N. J.
Ric-wil Co, 1561 Union Commerce Bldg, Cleveland, Ohio
Badger, E B, & Sons Co, 75 Pitts St, Boston, Mass.
Ehret Magnesia Mfg Co, Valley Forge, Pa.

UNIONS

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Dart, E M, Mfg Co, 134 Thurbers Ave, Providence, R. I.
Fairbanks Co, 397 Lafayette St, New York, N. Y.
Jarecki Mfg Co, Erie, Pa.
Jefferson Union Co, 601 W 26th St, New York, N. Y.
Kennedy Valve Mfg Co, Elmira, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, O.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Walworth Co, 60 E 42nd St, New York, N. Y.
Central Forging Co, Catawissa, Pa.
Clow, James B, & Sons, N Talman Ave, Chicago, Ill.
Gaso Pump & Burner Mfg Co, Tulsa, Okla.
Leahy Mfg Co, Los Angeles.
Malleable Iron Fittings Co, Branford, Conn.
Mark, Clayton, & Co, Box 467, Evanston, Ill.
Pittsburgh Valve & Fittings Corp, Barberton, Ohio
Randle Machinery Co, Cincinnati, Ohio
Rhode Island Fittings Co, Hillsgrove, R. I.
Rhode Island Malleable Iron Works, Hillsgrove, R. I.
Rockwood Sprinkler Co, 54 Harlow St, Worcester, Mass.
Sherman, H B, Mfg Co, Battle Creek, Mich.
Standard Union Co, Lockport, N. Y.
United Superior Union Co, 29 Ryerson St, Brooklyn, N. Y.

USED EQUIPMENT

(See Classified Index in Searchlight Section)

VACUUM-CLEANING SYSTEMS

(See Cleaning Systems, Vacuum)

VALVE OPERATORS, HAND-CHAIN

Babbitt Steam Specialties Co, 5 S Water St, New Bedford, Mass.
Crane Co, 836 S Michigan Ave, Chicago, Ill.

VALVE OPERATORS, MOTOR

Chapman Valve Mfg Co, Pinedale St, Indian Orchard, Mass.
Crane Co, 836 S MichiganAve, Chicago, Ill.
Cutler-Hammer Inc, 606 N 12th St, Milwaukee, Wis.
Philadelphia Gear Works, Erie Ave & G St, Phila, Pa.

VALVE-RESEATING MACHINES

Leavitt Machine Co, 8 E River St, Orange, Mass.

VALVES, COMPRESSED-AIR

Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Homestead Valve Mfg Co, Box 210, Coraopolis, Pa.
Powell, Wm, Co, Cincinnati, O.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Norgren, C A, Co, 210 Santa Fe Drive, Denver, Colo.

VALVES, AMMONIA, CARBON-DIOXIDE

Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Reading-Pratt & Cady Div, 929 Conn. Ave, Bridgeport, Conn.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Walworth Co, 60 E 42nd St, New York, N. Y.
Worthington Pump & Machinery Corp, Harrison, N. J.
Baker Ice Machine Co, Omaha, Neb.
Electric Valve Mfg Co, 67 Murray St, New York, N. Y.
General Controls Co, 267 5th Ave, New York, N. Y.
Lonergan, J E, Co, Race St, Philadelphia, Pa.
Refrigerating Specialties Co, Chicago, Ill.
Vilter Mfg Co, 2217 S 1st St, Milwaukee, Wis.
York Ice Machry Corp, York, Pa.

VALVES, BALANCED

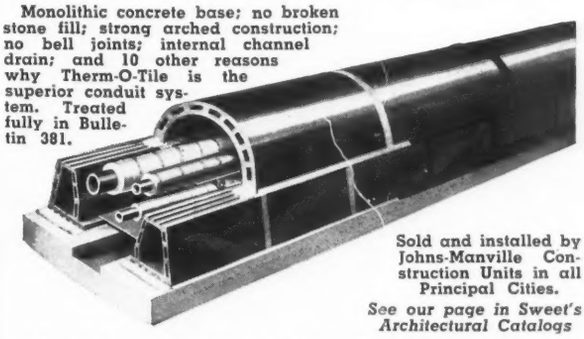
Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Davis Regulator Co, 2540 Washtenaw Ave, Chicago, Ill.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Kennedy Valve Mfg Co, Elmira, N. Y.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Atwood & Morrill Co, Salem, Mass.
Defender Automatic Regulator Co, St Louis, Mo.
d'Este, Julian, Co, 6 Spice St, Charlestown, Mass.
Illinois Engrg Co, Chicago, Ill.
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Kitts Steam Specialty Co, 272 W Second Ave, Oswego, N. Y.
Lewis Steam Specialty & Valve Co, Ashmead St, Philadelphia, Pa.
Mueller Co, Decatur, Ill.
Philadelphia Valve Co, Aramingo Ave, Philadelphia, Pa.
Power Turbo-Blower Co, 30 Vesey St, New York, N. Y.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
U. S. Wind Engine & Pump Co, Batavia, Ill.
Waters Governor Co, 1123 Oliver Bldg, Boston, Mass.

THERM-O-TILE

The Conduit for Underground Steam Lines

SIMPLEST • STRONGEST • MOST EFFICIENT

Monolithic concrete base; no broken stone fill; strong arched construction; no bell joints; internal channel drain; and 10 other reasons why Therm-O-Tile is the superior conduit system. Treated fully in Bulletin 381.



Sold and installed by Johns-Manville Construction Units in all Principal Cities.

See our page in Sweet's Architectural Catalogs

H. W. PORTER & CO., Inc.

827-P Frelinghuysen Ave., Newark, N. J.

Without obligating us in any way, ☐ Please send Bulletin 381; ☐ Send representative. Enclosed is a sketch, with principal data of a prospective job on which we shall be glad to have your comments or quotations.

Name .....

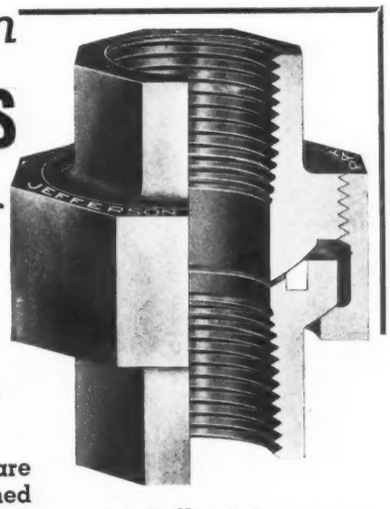
Firm .....

Street .....

City ..... State .....

Jefferson

UNIONS



FOR PRESSURES UP TO 300 lbs. S.W.P.

Jefferson Unions are made of air-refined malleable iron with ground ball joints—carefully inspected — a full and complete line of Unions and Union specialties.

Jefferson also makes a full line of "Stanco" 250 lb. Unions and Pipe Fitting Specialties as well as the "Duplex" 300 lb. brass-to-brass seat unions.

●

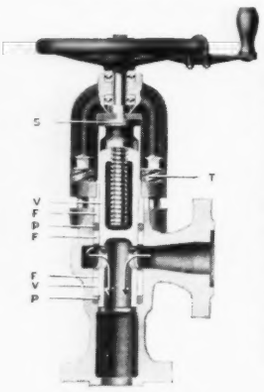
Write for catalog covering details of the complete Jefferson line. Get in touch with your nearest distributor.

JEFFERSON UNION COMPANY

(Sales Dept.) NEW YORK: 601 W. 26th St.
(Factory) LEXINGTON, MASS.

YARWAY BLOW-OFF VALVES

Used singly or in tandem in more than 12,000 plants in 67 different industries. Recommended by leading steam plant designers and builders of steam generating equipment.



Seatless Type

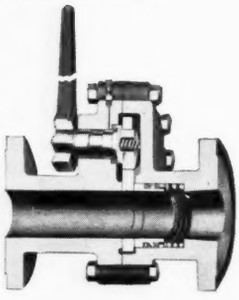
Made in several styles for working pressures up to 1500 lbs. Sizes 1" to 2½". Angle and straightway.

OPERATION: After valve has been closed, shoulder S on plunger V contacts upper follower gland F, forcing it down into body and compressing packing P above and below port, making an absolutely tight valve. Yoke tension springs T maintain continuous compression on packing train. Alemite lubrication of plunger and stem.

Send for celluloid working model and Bulletins B-420 and B-421.

Double-Tightening Type

Lever-operated, swing gate design with unique feature of sealing bushing on inlet side, making it double-tightening on both sides of gate. When open provides straight through passage for unobstructed flow. Alemite lubrication of stem and disc. Made in several styles for pressures to 300 lbs. Sizes 1" to 2½". Write for Bulletin B-420.



Tandems

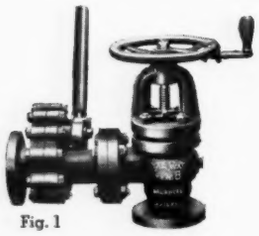


Fig. 1

Fig. 1, Yarway Seatless and Double-Tightening Tandem for pressures of 200 to 300 lbs.

Fig. 2, Yarway Seatless Type C Tandem for 400 to 600 lbs. pressure. Sizes 1" to 2½".

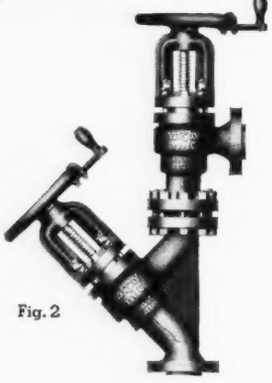


Fig. 2

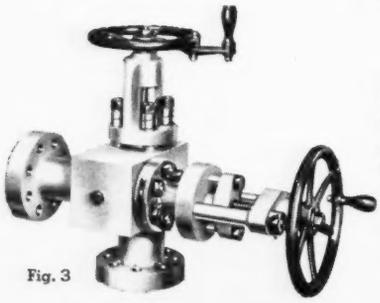


Fig. 3

Fig. 3, Yarway Unit Tandem Valve in which hard seat valve and seatless valve are mounted together in one-piece forged steel body. Sizes 1" to 2", pressures 600 to 2,500 lbs.

Write for Bulletins B-420 and B-430.

See other Yarway Advertisements on pages 101, 181, 184, and 209.

YARNALL-WARING COMPANY
100 MERMAID AVE., PHILA.

Watts Regulator Co, Lawrence, Mass.

VALVES, BLOW-OFF

Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Elliott Co, Jeannette, Pa.
Fairbanks Co, 397 Lafayette St, New York, N. Y.
Homestead Valve Mfg Co, 210 Box, Coraopolis, Pa.
Jarecki Mfg Co, Erie, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, Ohio
Powell Wm, Co, Cincinnati, O.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Walworth Co, Inc, 60 E 42nd St, New York, N. Y.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.
Bordo, L J, Co, Glenside, Pa.
Carthage Machine Co, Carthage, N. Y.
Everlasting Valve Co, 53 Fisk St, Jersey City, N. J.
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Keckley, O C, Co, Chicago, Ill.
Kitts Steam Specialty Co, 272 W 2nd St, Oswego, N. Y.
Ludlow Valve Mfg Co, Foot of Adams St, Troy, N. Y.
Ohio Injector Co, 150 Ohio Ave, Wadsworth, Ohio
Williams, D T, Valve Co, 2854 Spring Grove Ave, Cincinnati, O.

VALVES, CHECK

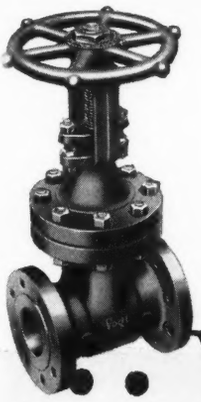
Chapman Valve Mfg Co, Pinevale St, Indian Orchard, Mass.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Darling Valve & Mfg Co, Williamsport, Pa.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Fairbanks Co, 397 Lafayette St, New York, N. Y.
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Golden - Anderson Valve Specialty Co, Fulton Bldg, Pittsburgh, Pa.
Jarecki Mfg Co, Erie, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Kennedy Valve Mfg Co, Elmira, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, O.
Powell, Wm, Co, Cincinnati, O.
Reading-Pratt & Cady Div, 929 Conn Ave, Bridgeport, Conn.
Strong Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Walworth Co, 60 E 42nd St, New York, N. Y.
Alco Valve Co, St. Louis, Mo.
Baker Ice Mach Co, Omaha, Neb.
Barrett, Haentjens & Co, Hazleton, Pa.
Boyts, Porter & Co, Connellsville, Pa.
Central Forging Co, Catawissa, Pa.
Cook, A D, Inc, Lawrenceburg, Ind.
Draper Mfg Co, Port Huron, Mich.
Duriron Co Inc, Dayton, Ohio
Gaso Pump & Burner Mfg Co, Tulsa, Okla.
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
M & H Valve & Fittings Co, Anniston, Ala.
Milwaukee Valve Co, Milwaukee, Wis.
Mueller Co, Chattanooga, Tenn.
Norgren, C A, Co, 210 Santa Fe Drive, Denver, Colo.
Ohio Injector Co, 150 Ohio Ave, Wadsworth, Ohio
Parker Appliance Co, Cleveland, Ohio
Pittsburgh Valve & Fittings Corp, Barberton, Ohio
Plouff Co, Columbus A[illegible] Boston, Mass.
Randle Machinery Co, Cin[illegible] nati, Ohio
Ruggles-Klingemann Mfg [illegible] Salem, Mass.
Schutte & Koerting Co, 1[illegible] & Thompson Sts, Phila, P[illegible]
Stockham Pipe Fittings [illegible] Birmingham, Ala.
Taco Heaters Inc, 342 Madi[illegible] Ave, New York, N. Y.
Williams Gauge Co, 1[illegible] Penna. Ave, N S, Pittsbur[illegible] Pa.
Williams, D T, Valve Co, 2[illegible] Spring Grove Ave, Cinc[illegible] nati, O.

VALVES, DIAPHRAGM

Atlas Valve Co, 289 South [illegible]t, Newark, N. J.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill. Ill.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Taylor Instrument Cos, Rochester, N. Y.
Belfield, H, Co, Phila, Pa.
General Controls Co, 267 [illegible]th Ave, New York, N. Y.
Grove Regulator Co, 1729 Poplar St, Oakland, Calif.
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Illinois Engrg Co, Chicago, Ill.
Keiley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Klipfel Mfg Co, Chicago, Ill.
Lonergan, J E, Co, Philadelphia, Pa.
Milwaukee Valve Co, Milwaukee, Wis.
Minneapolis - Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Mueller Co, Decatur, Ill.
Norgren, C A, Co, 210 Santa Fe Drive, Denver, Colo.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.

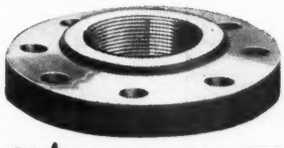
VALVES, ELECTRICALLY OPERATED

Chapman Valve Mfg Co, Pinevale St, Indian Orchard, Mass.
Cutler-Hammer, Inc, 606 N 12th St, Milwaukee, Wis.
Darling Valve & Mfg Co, Williamsport, Pa.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Frick Co, Inc, 325 Broadway, Waynesboro, Pa.
Golden-Anderson Valve Specialty Co, Fulton Bldg, Pittsburgh, Pa.
Nicholson, W H, & Co, 125 Oregon St, Wilkes-Barre, Pa.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Powell, Wm, Co, Cincinnati, O.
Reading-Pratt & Cady Div, 929 Conn. Ave, Bridgeport, Conn.
Walworth Co, 60 E 42nd St, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Alco Valve Co, St Louis, Mo.
American Radiator Co, 40 W 40th St, New York, N. Y.
Atkins, E C, & Co, Indianapolis, Ind.
Automatic Switch Co, 41 E 11th St, New York, N. Y.
Automatic Temperature Control Co, Germantown Ave & Logan St, Philadelphia, Pa.
Barker-Coleman Co, Rockford, Ill.
Bristol Co, Waterbury, Conn.
Electric Valve Mfg Co, Inc, [illegible] Murray St, New York, N. [illegible]
Freiz, Julien P, & Sons Inc, [illegible] N Central Ave, Baltimo[illegible] Md.
General Controls Co, 267 [illegible]th Ave, New York, N. Y.



DROP FORGED FOR SAFETY AND ECONOMY UNDER THE MOST TRYING CONDITIONS

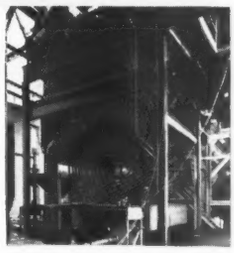
Valves, Fittings and Flanges by Vogt — the choice of operating men everywhere for safe and sure regulation of the high pressure and high temperature liquids and gases used in modern process work.



• • Vogt PRODUCTS are • •

HIGH OPERATING EFFICIENCIES AND LOW MAINTENANCE COSTS

More steam per dollar of investment—because Vogt Boilers are designed and built to fit in with specific operating conditions. Available in bent tube, sectional header, box header and return tubular types using coal, oil, gas or waste heat for fuel.



• • DESIGNED to RAISE • •

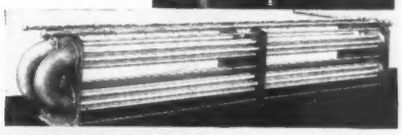
MEETING THE DEMANDS FOR OPERATING SECURITY

Vogt has every facility for the fabrication of stills, towers, continuous rotary filters, filter presses, oil chilling machines, heat exchangers, etc., and these products are serving the petroleum industry around the world.

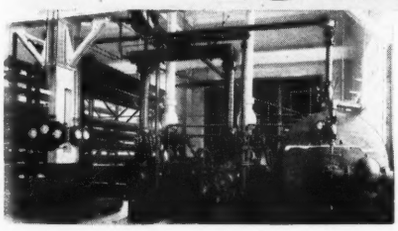
• • OPERATING STANDARDS and • •

TO COMBAT CORROSION AND PREVENT PRODUCT CONTAMINATION

Process equipment made from special metals and alloys for the exacting service of the chemical plant is fabricated in our modern shops for many of the well known chemical companies.



• • LOWER YOUR COSTS • •



STEPS TONNAGE UP AND COSTS DOWN

Our experience of more than half century in building profit-making ice and refrigerating machinery is at your command. We make complete units for ice and cold storage plants, packing plants, dairies, breweries, chemical plants, oil refineries and related industries.

Vogt PRODUCTS

NEW YORK
PHILADELPHIA
CLEVELAND
CINCINNATI
ST. LOUIS
CHICAGO
DALLAS

HENRY VOGT MACHINE CO., INCORPORATED LOUISVILLE, KENTUCKY

Hannifin Mfg Co, Chicago, Ill.
Illinois Engrg Co, Chicago, Ill.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
McDonnell & Miller, Room 1305, Wrigley Bldg, Chicago, Ill.
McQuay-Norris Mfg Co, St Louis, Mo.
Mercoid Corp., 4229 Belmont Ave, Chicago, Ill.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Penn Electric Switch Co, Goshen, Ind.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Sterling Engrg Co, Milwaukee, Wis.
Supreme Elect Products Corp, 103 Mt Hope Ave, Rochester, N. Y.
Universal Gear Corp, 1477 E 19th St, Indianapolis, Ind.

VALVES, FLOAT

Atlas Valve Co, 289 South St, Newark, N. J.
Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Davis Regulator Co, 2540 Washtenaw Ave, Chicago, Ill.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Golden-Anderson Valve Specialty Co, Fulton Bldg, Pittsburgh, Pa.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Alco Valve Co, St. Louis, Mo.
Atwood & Morrill Co, Salem, Mass.
Caldwell, W E, Co Inc, 280 Brandeis St, Louisville, Ky.
Defender Automatic Regulator Co, St Louis, Mo.
d'Este, Julian, Co, 6 Spice St, Charlestown, Mass.
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Milwaukee Valve Co, Milwaukee, Wis.
Mueller Co, Chattanooga, Tenn.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Trimbey Machine Works, Glens Falls, N. Y.
U. S. Wind Engine & Pump Co, Batavia, Ill.
Waters Governor Co, 1123 Oliver Bldg, Boston, Mass.
Watts Regulator Co, Lawrence, Mass.

VALVES, FLUSHING

Sloan Valve Co, 4300 W Lake St, Chicago, Ill.

VALVES, GATE

Chapman Valve Mfg Co, Pinevale St, Indian Orchard, Mass.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Darling Valve & Mfg Co, Williamsport, Pa.
Fairbanks Co, 397 Lafayette St, New York, N. Y.
Jarecki Mfg Co, Erie, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Kennedy Valve Mfg Co, Elmira, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, Ohio
Powell, Wm, Co, Cincinnati, O.
Reading-Pratt & Cady Div, 929 Conn. Ave, Bridgeport, Conn.
Vogt, Henry, Machinery Co, 1001 W Ormsby St, Louisville, Ky.
Walworth Co, Inc, 60 E 42nd St, New York, N. Y.
Bordo, L J, Co, Glenside, Pa.
Boyts, Porter & Co, Connellsville, Pa.
Duriron Co Inc, Dayton, Ohio
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
Ludlow Valve Mfg Co, Foot of Adams St, Troy, N. Y.
M & H Valve & Fittings Co, Anniston, Ala.
Milwaukee Valve Co, Milwaukee, Wis.
Mueller Co, Chattanooga, Tenn.
Ohio Injector Co, 150 Ohio Ave, Wadsworth, Ohio
Pittsburgh Valve & Fittings Corp, Barberton, Ohio
Plouff Co, Columbus Ave, Boston, Mass.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Stockham Pipe Fittings Co, Birmingham, Ala.
Williams, D T, Valve Co, 2854 Spring Grove Ave, Cincinnati, O.

VALVES, GLOBE

Chapman Valve Mfg Co, Pinevale St, Indian Orchard, Mass.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Fairbanks Co, 397 Lafayette St, New York, N. Y.
Jarecki Mfg Co, Erie, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Kennedy Valve Mfg Co, Elmira, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, O.
Powell, Wm, Co, Cincinnati, O.
Reading-Pratt & Cady Div, 929 Conn. Ave, Bridgeport, Conn.
Strong, Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Walworth Co, Inc, 60 E 42nd St, New York, N. Y.
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Klingerit, Inc, 16 Hudson St New York, N. Y.
Limbert, Geo B, & Co, 570 Fulton St, Chicago, Ill.
Milwaukee Valve Co, Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Ohio Injector Company, 150 Ohio Ave, Wadsworth, Ohio
Parker Appliance Co, Cleveland, Ohio
Pittsburgh Valve & Fittings Corp, Barberton, Ohio
Plouff Co, Columbus Ave, Boston, Conn.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Stockham Pipe Fittings Co, Birmingham, Ala.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Williams, D T, Valve Co, 2854 Spring Grove Ave, Cincinnati.

VALVES, HYDRAULIC

Chapman Valve Mfg Co, Pinevale St, Indian Orchard, Mass.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Darling Valve & Mfg Co, Williamsport, Pa.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Fairbanks Co, 397 Lafayette St, New York, N. Y.
Homestead Valve Mfg Co, Box 210, Coraopolis, Pa.
Jarecki Mfg Co, Erie, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Kennedy Valve Mfg Co, Elmira, N. Y.
Powell, Wm, Co, Cincinnati, O.
Reading-Pratt & Cady Div, 929 Conn. Ave, Bridgeport, Conn.
Vogt, Henry, Machine Co, 1001 W Ormsby St, Louisville, Ky.
Walworth Co, 60 E 42nd St, New York, N. Y.
Watson-Stillman Co, Roselle, N. J.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.
Baldwin-Southwark Corp, Philadelphia, Pa.
Dunning & Boschert Press Co, Syracuse, N. Y.
Hancock Valve Div, 143 E[illegible] St, Bridgeport, Conn.
Hunt, Rodney, Machine Co, [illegible]ange, Mass.
Logansport Machine Inc, [illegible] Cotner Rd, Logansport, I[illegible]
Norgren, C A, Co, 210 Santa [illegible] Drive, Denver, Colo.
Oilgear Co, 1421 W Bruce [illegible], Milwaukee, Wis.
Smith, S Morgan, 500 Li[illegible]n St, York, Pa.

VALVES, PLUG

Crane Co, 836 S Michigan [illegible]e, Chicago, Ill.
Fairbanks Co, 397 Lafa[illegible]te St, New York, N. Y.
Homestead Valve Mfg Co, [illegible]ox 210, Coraopolis, Pa.
Jenkins Bros, 81 White St, [illegible]ew York, N. Y.
Powell, Wm Co, Cincinnati, O.
Reading-Pratt & Cady Div, [illegible]929 Conn. Ave, Bridgeport, Conn.
Walworth Co, Inc, 60 E [illegible]nd St, New York, N. Y.
Barrett, Haentjens & Co, [illegible]azleton, Pa
Bordo, L J, Co, Glenside, Pa.
Duriron Co, Inc, Dayton, Ohio
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Hunt, Rodney, Machine Co, Orange, Mass.
Klingerit, Inc, 16 Hudson St, New York, N. Y.
Merco-Nordstrom Valve Co, Lexington Ave, Pittsburgh, Pa.
Parker Appliance Co, Cleveland, Ohio
Philadelphia Valve Co, Aramingo Ave, Philadelphia, Pa.
Williams, D T, Valve Co, 2854 Spring Grove Ave, Cincinnati, O.

VALVES, PUMP AND COMPRESSOR

Garlock Packing Co, 400 Main St, Palmyra, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y
Worthington Pump & Machine Corp, Harrison, N. J.
Anchor Packing Co, 401 N Broad St, Philadelphia, Pa.
Birch Mfg Co, 1523 Sedgwick St, Chicago, Ill.
Dick, R & J, Co, Inc, Colfax Ave, Passaic, N. J.
Durabla Mfg Co, 114 Liberty St, Room 202, New York, N. Y.
Goodrich, B F, Co, 460 S Main St, Akron, Ohio
Goulds Pumps Inc, 310 Falls St, Seneca Falls, N. Y.
Hill Pump Valve Co, Chicago, Ill.
Klingerit, Inc, 16 Hudson St, New York, N. Y.
Linear Packing & Rubber Co, State Rd & Levick St, Phila, Pa
Phoenix Specialty Mfg Co, 155 Wooster St, New York, N. Y.
Williams Gauge Co, 1938 Penna. Ave, N S, Pittsburgh, Pa.

VALVES, RADIATOR, HEATING

Anderson, V D, Co, 1934 W 96th St, Cleveland, Ohio
Davis Regulator Co, 2540 Washtenaw Ave, Chicago, Ill.
Fulton Sylphon Co, Knoxville, Tenn.
Hoffman Specialty Co, Inc, Waterbury, Conn.
Jarecki Mfg Co, Erie, Pa.

Look for the noun in the product listing, for example:

"Valves, Regulating"

not

"Regulating Valves"

Here are Typical examples of the

ATLAS Regulating Valves

that are listed in this issue of Power.

Fig. 700. The CAMPBELL Feed Water Regulator.

Fig. 701. This valve controls the CAMPBELL. The latter has no floats, thermostats, generators, or moving parts.

The Atlas Valve Company has been making Regulating Valves *exclusively* for nearly a half century. "Regulating Valves for Every Service" is the Atlas slogan.

Make it a habit to put your regulating problems up to ATLAS, always. In other words, Standardize on Atlas Regulating Valves.

Check the list of principal Atlas products below, write your name, firm, and address on the margin, tear out with this ad., include any special facts we may need, mail, and you will hear from us promptly.

Fig. 230. This ATLAS Lever Operated Control Valve is "going places." Are you acquainted with it?

Fig. 503. A VICTOR Damper Regulator. We make them for nearly all pressures and services.

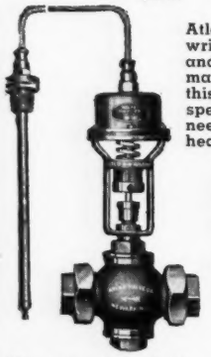


Fig. 650. One of the VICTOR Temperature Regulators.

ATLAS VALVE COMPANY

REGULATING VALVES FOR EVERY SERVICE

289 South St., Newark, N. J.

Please send information on the following Atlas products without obligating me in any way:—

- ☐ Temperature Regulators
- ☐ Float Valves
- ☐ Campbell Boiler Feed Water Regulator
- ☐ Reducing Valves
- ☐ Exhaust Control System
- ☐ Damper Regulators
- ☐ Pump Governors
- ☐ Thermostats
- ☐ Balanced Valves
- ☐ Control Valves
- ☐ Humidity Controllers
- ☐ Oil Control Cocks
- ☐ Pressure Regulators

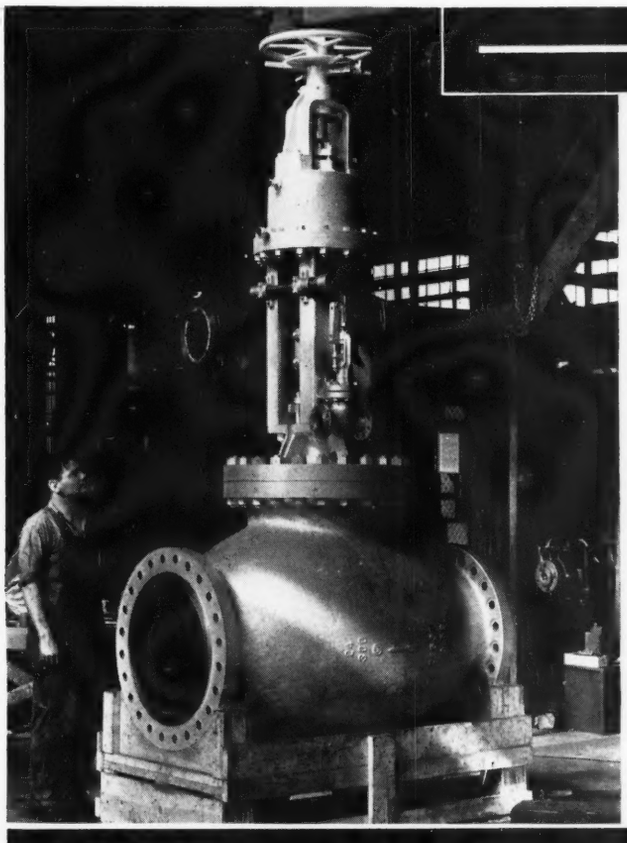
enkins Bros, 81 White St, New York, N. Y.
ennedy Valve Mfg Co, Elmira, N. Y.
Iason Neilan Regulator Co, 1186 Adams St, Boston, Mass.
owell, Wm, Co, Cincinnati, O.
arco Co, Inc, 183 Madison Ave, New York, N. Y.
Valworth Co, 60 E 42nd St, New York, N. Y.
Vebster, Warren, & Co, Camden, N. J.
Barnes & Jones. Inc, Boston, Mass.
d'Este, Julian, Co, 6 Spice St, Charlestown, Mass.
Dole Valve Co, 1901–1941 Carroll Ave, Chicago, Ill.
Dunham, C A, Co, E Ohio St, Chicago, Ill.
Gorton Heating Corp, 17 North Ave, Cranford, N. J.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
Milwaukee Valve Co, Milwaukee, Wis.
Monash-Younker Co Inc, W Congress St, Chicago, Ill.
Minneapolis-Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Williams, D T, Valve Co, 2854 Spring Grove, Cincinnati, O.
Wright-Austin Co, Detroit, Mich.

VALVES, REGULATING

Atlas Valve Co, 289 South St, Newark, N. J.
Bailey Meter Co, 1036 Ivanhoe Rd, Cleveland, Ohio
Cash, A W, Co, 402 N Eldorado St. Decatur, Ill.
Chaplin-Fulton Mfg Co, 28-40 Penn Ave, Pittsburgh, Pa.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Eddington Metal Specialty Co, Box K, Eddington, Pa.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Golden-Anderson Valve Specialty Co, Fulton Bldg, Pittsburgh, Pa.
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Hays Corp, 905 8th St, Michigan City, Ind.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Squires, C E, Co, E 40th St & Kelley Ave, Cleveland, O.
Stickle Steam Specialties Co, 2217 Valley Ave, Indianapolis, Ind.
Strong, Carlisle & Hammond Co, 1392 W 3rd, Cleveland, O.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Taylor Instrument Cos, Rochester, N. Y.
Atwood & Morrill Co, Salem, Mass.
Bristol Co, Waterbury, Conn.
Defender Automatic Regulator Co, St. Louis, Mo.
d'Este, Julian, Co, 6 Spice St, Charlestown, Mass.
General Controls Co, 267 5th Ave, New York, N. Y.
Grove Regulator Co, 1729 Poplar St, Oakland, Calif.
Hauck Mfg Co, 126 10th St, Brooklyn, N. Y.
Illinois Engrg Co, Racine Ave, Chicago, Ill.
Kieley & Mueller, Inc, 40 W 13th St, New York, N. Y.
Leslie Co, Lyndhurst, N. J.
Logansport Machine, Inc, 914 Cotner Rd, Logansport, Ind.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Mercon Regulator Co, 3257 N 29th St, Milwaukee, Wis.
Minneapolis - Honeywell Regulator Co, 4490 Wayne Ave, Phila, Pa.
Monarch Mfg Works, 2731 E Westmoreland St, Phila, Pa.
Mueller Co, Decatur, Ill.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Sterling Engrg Co, Milwaukee.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Tryco Products Inc, 1 Railroad Ave, Westfield, Mass.
Waters Governor Co, 1123 Oliver Bldg, Boston, Mass.
Watson & McDaniel Co, 441 N Marshall St, Philadelphia, Pa.

VALVES, RELIEF

Cash, A W, Co, 402 N Eldorado St, Decatur, Ill.
Cochrane Corp, 3106 N 17th St, Philadelphia, Pa.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Edward Valve & Mfg Co, 1150 W 145th St, East Chicago, Ind.
Elliott Co, Jeannette, Pa.
Fisher Governor Co, 400 Fisher Bldg, Marshalltown, Iowa
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Hoffman Specialty Co, Inc, Waterbury, Conn.
Kennedy Valve Mfg Co, Elmira, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, O.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Powell, Wm, Co, Cincinnati, O.
Republic Flow Meters Co, 2222 Diversey Pkwy, Chicago, Ill.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Swartwout Co, 18501 Euclid Ave, Cleveland, Ohio
Ashton Valve Co, 165 1st St, Cambridge, Mass.
Atwood & Morrill Co, Salem, Mass.
Barnes & Jones, Inc, Boston, Mass.
Boyts, Porter & Co, Connellsville, Pa.
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
Dunham, C A, Co, E Ohio St, Chicago, Ill.
Gorton Heating Corp, 17 North Ave, Cranford, N. J.
Grove Regulator Co, 1729 Poplar St, Oakland, Calif.
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
Leahy Mfg Co, Los Angeles, Calif.
Logansport Machine, Inc, 914 Cotner Rd, Logansport, Ind.
Lonergan, J E, Co, Philadephia, Pa.
Marsh, Jas P, Corp, 2049 Southport Ave, Chicago, Ill.
Mercon Regulator Co, 2357 N 29th St, Milwaukee, Wis.
Monash-Younker Co, Inc, W Congress St, Chicago, Ill.
Mueller Co, Decatur, Ill.
Parker Appliance Co, Cleveland, O.
Pittsburgh DuBois Co, DuBois, Pa.
Plouff Co, Columbus Ave, Boston, Mass.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schade Valve Mfg Co, N Bodine St, Philadelphia, Pa.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.
Staples & Pfeiffer, Ltd, San Francisco, Calif.
Sterling Engrg Co, Milwaukee, Wis.
Tryco Products Inc, 1 Railroad Ave, Westfield, Mass.
Watson & McDaniel Co, 441 N Marshall St, Philadelphia, Pa.



VALVES

Regulating and Pressure Reducing

For your key jobs, where valves must not fail—where they must continuously and accurately regulate the pressures and flows of steam and water on which other vital processes depend—Republic-Smoot valves give you the dependability you need.

ANY STEAM CONDITIONS

These valves are of the gradual-opening, high-lift, double-seated type, lever or hydraulic-operated, built to A. S. A. standards for steam conditions up to 1500 lb. per sq. in., 950 F and capacities up to 1,000,000 lb. of steam an hour.

STABLE REGULATION

Republic-Smoot valves will regulate accurately from maximum flow down to 2 per cent of maximum.

CUSTOM-MADE CONSTRUCTION

Republic-Smoot valves are built for any piping condition, with inlet and outlet sizes proportioned for specific pressure reductions. Special steels are used, depending on service requirements.

ONE-PIECE STEM

Valve stem and discs are machined from a single stainless steel forging.

Let a Republic Engineer consult with you on your specific pressure and flow regulating problems.

FOR COMPLETE DETAILS WRITE FOR BULLETIN No. S-40

REPUBLIC FLOW METERS CO. 2222 DIVERSEY PKWY. CHICAGO, ILLINOIS

VALVES, SAFETY

Brown Instrument Co, 4490 Wayne Ave, Philadelphia, Pa.
Cash, A W, Co, 402 N Elderado St, Decatur, Ill.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Jarecki Mfg Co, Erie, Pa.
Jenkins Bros, 81 White St, New York, N. Y.
Kennedy Valve Mfg Co, Elmira, N. Y.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, Ohio
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Powell, Wm, Co, Cincinnati, O.
Ashton Valve Co, 165 1st St, Cambridge, Mass.
Atwood & Morrill Co, Salem, Mass.
Coale Muffler & Safety Valve Co, Baltimore, Md.
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
Hancock Valve Div, 143 Elias St, Bridgeport, Conn.
Kunkle Valve Co, Fort Wayne, Ind.
Leahy Mfg Co, Los Angeles, Calif.
Lonergan, J E, Co, Race St, Philadelphia, Pa.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Pittsburgh Valve & Fittings Corp, Barberton, Ohio
Schade Valve Mfg Co, 6 Bodine St, Philadelphia, Pa.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Schutte & Koerting Co, 12th & Thompson Sts, Phila, Pa.
Standard Valve Mfg Co, Boston, Mass.

VENTILATION

GraybaR Everything Electrical QUALITY GraybaR ELECTRIC COMPANY

One Item of the Graybar 60,000
All types of fans and blowers for every plant and office requirement.

DISTRIBUTED BY
GraybaR ELECTRIC COMPANY
IN 83 PRINCIPAL CITIES

VALVES, THERMOSTATIC

Atlas Valve Co, 289 South St, Newark, N. J.
Crane Co, 836 S Michigan Ave, Chicago, Ill.
Davis Regulator Co, 2540 S Washtenaw Ave, Chicago, Ill.
Hoffman Specialty Co, Waterbury, Conn.
Foster Engrg Co, 109 Monroe St, Newark, N. J.
Fulton Sylphon Co, Knoxville, Tenn.
Mason-Neilan Regulator Co, 1186 Adams St, Boston, Mass.
Northern Equipment Co, 1221 Grove Drive, Erie, Pa.
Sarco Co, Inc, 183 Madison Ave, New York, N. Y.
Taylor Instrument Cos, Rochester, N. Y.
American Radiator Co, 40 W 40th St, New York, N. Y.
Bristol Co, Waterbury, Conn.
Dole Valve Co, 1901–1941 Carroll Ave, Chicago, Ill.
General Controls Co, 267 5th Ave, New York, N. Y.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
Mercoid Corp, 4229 Belmont Ave, Chicago, Ill.
Monash-Younker Co, Chicago, Ill.
Powers Regulator Co, 2815 Greenview Ave, Chicago, Ill.
Refrigerating Specialties Co, Chicago, Ill.
Ruggles-Klingemann Mfg Co, Salem, Mass.
Spence Engrg Co, Inc, 61 Grant St, Walden, N. Y.
Watson & McDaniel Co, 441 N Marshall St, Philadelphia, Pa.

VARNISHES, INSULATING

General Electric Co, Schenectady, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Bakelite Corp, 247 Park Ave, New York, N. Y.
Keystone Varnish Co, 75 Otsego St, Brooklyn, N. Y.
White Co, 3200 E Biddle St, Baltimore, Md.

VENTILATING SYSTEMS, VENTILATORS

American Blower Corp, 6[illegible] Russell St, Detroit, Mich.
Buffalo Forge Co, 488 Broadway, Buffalo, N. Y.
Clarage Fan Co, Kalamazoo, Mich.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Johns-Manville, 22 E 40th St, New York, N. Y.
Sturtevant, B F, Co, 47 Readville St, Hyde Park, Boston, Mass.
Airtherm Mfg Co, 1497 S Vandeventer Ave, St Louis, [illegible]
Allen, E H, Co, Dept P, 22 Prance St, Boston, Mass.
Arex Co, 333 N Michigan Ave, Chicago, Ill.
Autoforce Ventilating System, [illegible] Devonshire St, Boston, Mass.
Burt Mfg Co, 232 Main St, Akron, Ohio
Diehl Mfg Co, Elizabethport, N. J.
Garden City Fan Co, Chicago.
Iona Ventilator Co, 2821–29 Dowphin St, Philadelphia, Pa.
Kirk & Blum Mfg Co, 2831 Spring Grove Ave, Cincinnati, O.
Trane Co, 2012 Cameron Ave, La Crosse, Wis.
Typhoon Air Conditioning Co, 252 W 26th, New York, N. Y.
Western Blower Co, 1800–9th Ave, Seattle, Wash.
Wing, L J, Mfg Co, W 14th St & 7th Ave, New York, N. Y.
Young & Bertke Co, 1040 W Hulbert Ave, Cincinnati, Ohio

VISCOSIMETERS

Eimer & Amend, 3rd Ave & 18th St, New York, N. Y.

VOLTAGE REGULATORS

(See Regulators, Voltage)

VOLTMETERS

General Electric Co, Schenectady, N. Y.

A DIRECTORY AND HANDBOOK OF AUTOMATIC PRESSURE AND FLOW CONTROL EQUIPMENT FOR

BECAUSE Davis has long specialized in automatic valves for every type of service, the problem of giving you exactly what you want is merely a matter of knowing your requirements. Standard designs are available from stock to meet practically any condition. Special assemblies can be produced on short order. Features which might be considered special are often found to be standard with Davis making unnecesssary a long wait for special equipment to be designed and built. *For your own protection, always make it a habit to check with Davis on any automatic valve need.*

PRODUCTS MADE BY DAVIS (Standard Items)	Built to following pressure standards: 125 lbs.	250 lbs.	400 lbs.	600 lbs.	1500 lbs.	Materials: Body: Bronze	Semi-steel	Cast Steel	Trim: Bronze	Nickel Iron	Monel	Stainless Steel	Range of standard sizes:	Service: Steam	Air	Gas	Water	Oil
CONTROLLERS, Liquid Level	X	X	X				X	X	X			X	6", 8", 10" Floats				X	X
GOVERNORS, Pump	X	X	X			X	X	X	X		X	X	½" to 4"	X				
REGULATORS, Boiler Fuel Line	X	X	X			X	X	X	X	X	X	X	½" to 6"			X		X
Damper	X	X					X		X				3" or 4" x 12"	X				
Flow	X						X		X				10" to 24"	X				
Pressure	X	X	X	X	X	X	X	X	X	X	X	X	½" to 14"	X	X	X	X	X
STRAINERS, Pressure Line	X	X	X	X	X	X	X	X	X	X	X	X	⅛" to 12"	X	X	X	X	X
Suction Line	X						X		X			X	⅛" to 14"				X	X
TRAPS, Air	X	X					X		X				¾"		X			
Condensate	X	X	X				X	X	X		X	X	2" to 6"	X				
Steam	X						X		X			X	½" to 3"	X				
VALVES, Altitude	X	X	X				X	X	X		X	X	2" to 14"				X	
Back Pressure	X						X		X				2" to 24"	X		X		
Balanced	X	X	X	X		X	X	X	X	X	X	X	½" to 24"	X			X	X
Butterfly	X					X	X	X	X			X	3" to 24"	X			X	X
Check, Balanced	X	X	X	X			X	X	X			X	6" to 24"	X		X		
Check, Cushioned	X	X	X				X	X	X			X	2" to 12"	X			X	X
Diaphragm Motor	X	X	X	X		X	X	X	X	X	X	X	½" to 14"	X	X	X	X	X
Exhaust Relief	X						X		X				6" to 48"	X				
Float	X					X	X		X	X			½" to 12"				X	
Fluid Control	X	X				X	X		X	X			½" to 12"				X	X
Lever Operated	X	X	X	X		X	X	X	X			X	¾" to 24"	X	X	X	X	X
Low Water Fuel Cut Out	X	X	X				X	X	X			X	¾" to 4"					X
Motor Operated	X	X				X	X		X				½" to 10"	X	X	X	X	X
Pilot	X	X	X			X	X	X	X		X	X	⅛" to 2"	X	X	X	X	X
Relief	X	X	X				X	X	X			X	⅛" to 16"	X	X	X		
Relief, Balanced	X	X				X	X		X		X	X	½" to 14"	X		X		
Relief, Comb. Pres. & Vac.	X						X			X			2" to 8"			X		
Solenoid Operated	X	X	X	X	X	X	X	X	X	X	X	X	½" to 12"	X	X	X	X	X
Stop and Check	X	X	X	X	X		X	X	X			X	2" to 14"	X			X	
Trip, Emergency	X	X	X				X	X	X	X		X	½" to 14"	X		X		X
Turbine Non-return	X	X	X				X	X	X			X	4" to 24"	X				
Vacuum Breaker	X						X	X	X				2" to 12"		X	X	X	

DAVIS
REGULATOR COMPANY
2540 S. Washtenaw Ave. Chicago, Ill.

estinghouse Electric & Mfg Co, E Pittsburgh, Pa.
eston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
istol Co, Waterbury, Conn.
terline Angus Co, Box 596, Indianapolis, Ind.
ller-Smith Co, 1766 Market St, Bethlehem, Pa.

WALLS, BOILER-FURNACE, AIR-COOLED

eWolf Furnace Corp, 77 South Ave, Rochester, N. Y.
Engineer Co, 17 Battery Place, New York, N. Y.
American Arch Co, Inc, 60 E 42nd St, New York, N. Y.
Bernitz Furnace Appliance Co, 89 Broad St, New York, N. Y.
Bigelow-Liptak Corp, 2840 W Grand Blvd, Detroit, Mich.
Chicago Fire Brick Co, 1463 Elston Ave, Chicago, Ill.
Detrick, M H, Co, 140 S Dearborn, Chicago, Ill.
Drake Non-Clinkering Furnace Block Co, Beekman St, New York, N. Y.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Laclede-Christy Clay Products Co, 411 N 7th, St Louis, Mo.
McLeod & Henry Co Inc, 31 Monroe St, Troy, N. Y.
Plibrico Jointless Firebrick Co, 1818 Kingsbury, Chicago, Ill.
Ramtite Co, 2563 W 18th St, Chicago, Ill.
Reintjes, Geo P, Co, 2517 Jefferson, Kansas City, Mo.

WALLS, BOILER-FURNACE, WATER-COOLED

American Engrg Co, Aramingo Ave, Philadelphia, Pa.
Babcock & Wilcox Co, 85 Liberty St, New York, N. Y.
Controlled Steam Generators, 330 W 42nd St, New York, N. Y.
Combustion Engrg Co, Inc, 206 Madison Ave, New York, N. Y.
Edge Moor Iron Works, 30 Rockefeller Plaza, New York, N. Y.
Foster Wheeler Corp, 165 Broadway, New York, N. Y.
Keeler, E, Co, Williamsport, Pa.
Riley Stoker Corp, 999 Neponset St, Worcester, Mass.
Springfield Boiler Co, 1903 E Capitol Ave, Springfield, Ill.
Bernitz Furnace Appliance Co, 89 Broad St, New York, N. Y.
Bigelow Co, New Haven, Conn.
Kieley & Mueller Inc, 40 W 13th St, New York, N. Y.
Kitts Steam Specialty Co, 272 W 2nd St, Oswego, N. Y.
Plouff Co, Columbus Ave, Boston, Mass.
Williams Gauge Co, 1938 Penna. Ave, N S, Pittsburgh, Pa.
Wright-Austin Co, Detroit, Mich.
Bigelow-Liptak Corp, 2840 W Grand Blvd, Detroit, Mich.
Kennedy-Van Saun Mfg & Engrg Corp, 2 Park Ave, New York, N. Y.
Plibrico Jointless Firebrick Co, 1818 Kingsbury, Chicago, Ill.

WATER COLUMNS

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Diamond Power Specialty Corp, Box 288, Detroit, Mich.
Huyette, Paul B, Co, 403 N Broad St, Philadelphia, Pa.
Jarecki Mfg Co, Erie, Pa.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, Ohio
Reliance Gauge Column Co, 5902 Carnegie Ave, Cleveland, Ohio
Strong Carlisle & Hammond Co, 1392 W 3rd St, Cleveland, O.
Yarnall-Waring Co, Chestnut Hill, Philadelphia, Pa.
Bordo, L J, Co, Glenside, Pa.
Ernst Water Column & Gage Co, Livingston, N. J.

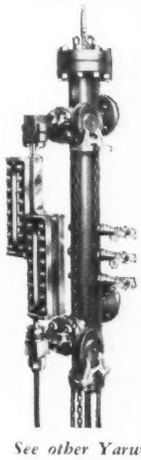
WATER TREATMENT, BOILER

Allis-Chalmers Mfg Co, Milwaukee, Wis.
American Sand-Banum Co, Dept M P, 9 Rockefeller Plaza, New York, N. Y.

YARWAY
WATER COLUMNS & GAGES

Widely used by public utilities, industrial plants and institutions. Sold as complete units or separate columns and gages.

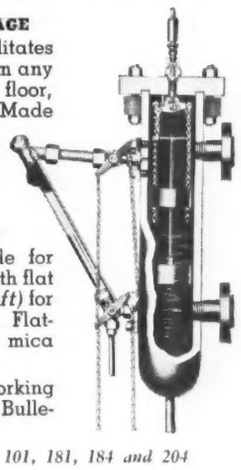
Floatless Hi-Lo Alarm in column depends for action on displacement of balanced solid weights. Whenever high or low water level destroys balance of weights, valve in top of column opens, admitting steam to alarm whistle. Yarway Water Columns made for all pressures up to 1500 lbs.



SESURE-INCLINED GAGE *(shown at right)* facilitates reading water level from any point on boiler room floor, even directly beneath. Made with round glass for pressures up to 400 lbs., with flat glass, pressures to 600 lbs.

VERTICAL GAGES with round glass made for pressures to 400 lbs., with flat glass *(illustrated at left)* for pressures to 1500 lbs. Flat-glass steel inserts are mica protected.

Send for celluloid working model and descriptive Bulletin WG-1807.



See other Yarway Advertisements on pages 101, 181, 184 and 204

YARNALL-WARING CO.
100 MERMAID AVE., PHILA.

Prevent Steam System Corrosion and Increase Heating Efficiency
with
CORAVOL
. . . . the convenient, safe, and proved way to new operating economies . . . .

LINES CORAVOL Circulates to Control Corrosion BOILER

▼ **CORAVOL** circulates throughout the entire steam system and protects every part against the destructive action of corrosive steam and condensate.

▼ **CORAVOL** cleans out rust and accumulated deposits from old corrosion, thus improving heat transfer and the efficiency of lines, valves, traps.

▼ **CORAVOL** is part of a complete technical service which also includes chemical treatment of: Boiler Feed Water . . . Cooling and Condenser Water . . . Hot Water Supply Systems . . . Plant and Municipal Supply . . . Refrigerating Brines . . .

WESTERN CHEMICAL COMPANY
WESTERN
CHEMICAL COMPANY
713–715 Washington Street
KANSAS CITY MISSOURI

Reduce PLANT OPERATION COSTS WITH SANTOSITE

By adding the proper amount of Santosite to boiler feed water, you can avoid costly repairs and replacements caused by oxygen corrosion of clean metal surfaces. Santosite in the proper amount is easy to apply and control, and will not decompose when maintained continuously in the boiler at 10 ppm. to 20 ppm.

Further information and samples for your experimentation are available on request. Write today. MONSANTO CHEMICAL COMPANY, St. Louis, U. S. A. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, London.

MONSANTO CHEMICALS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

Water Treating Service to Fit Your Needs!

Ask for Bulletins

NALCO service is designed to fit the needs of the individual plants. A Nalco engineer will diagnose, recommend, and apply the methods and chemicals, and set up a control system necessary to give complete satisfaction! We will be glad to give you full details without obligation. Write. NATIONAL ALUMINATE CORPORATION, 6222 W. 66th Place, Chicago, Ill.

THE Nalco SYSTEM OF WATER TREATMENT

W. H. & L. D. **BETZ** Laboratories

Chemical Engineers and Consultants on

Boiler Water Problems

•

Consultation • Plant Studies
Plant Design • Service Supervision

W. H. & L. D. BETZ, 234 W. Wyoming Ave., Phila.

WIRES and CABLES

Everything Electrical
GraybaR ELECTRIC COMPANY

One Item of the Graybar 60,000

All types of wires and cables including Rubber-Covered, Braided and Leaded Wire, Varnished Cambric, Boiler Room Wire and Portable Cords.

DISTRIBUTED BY

GraybaR ELECTRIC COMPANY

IN 83 PRINCIPAL CITIES

Betz, W H & L D, 234 W Wyoming Ave, Philadelphia, Pa.
Dearborn Chemical Co, 310 S Michigan Ave, Chicago, Ill.
E A Hamilton Co, 143 Park Ave, Syracuse, N. Y.
Elgin Softener Corp, 55 North St, Elgin, Ill.
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Monsanto Chemical Co, St Louis, Mo.
National Aluminate Corp, 6222 W 66th Place, Chicago, Ill.
Permutit Co, Dept A, 330 W 42nd St, New York, N. Y.
Western Chemical Co, 714 Washington St, Kansas City, Mo.
Acheson Colloids Corp, Port Huron, Mich.
Arrow Boiler Compound Co, 21 S 3rd St, Dept 21 P, St Louis, Mo.
Chemical Solvent Co, P O Box 487, Birmingham, Ala.
Feedwaters, Inc, 140 Cedar St, New York, N. Y.
Filtrators Co, 96 Liberty St, New York, N. Y.
Haering, D W, & Co, 2306 S Winchester, Chicago, Ill.
Warley, Thos C, & Co, 217 Bainbridge St, Phila, Pa.

WATER TREATMENT, CONDENSER, COOLING SUPPLY

Allis-Chalmers Mfg Co, Milwaukee, Wis.
Hagan Corp, Bowman Bldg, Pittsburgh, Pa.
Monsanto Chemical Co, St Louis, Mo.
National Aluminate Corp, 6222 W 66th Place, Chicago, Ill.
Oakite Products, Inc, 23 Thames St, New York, N. Y.
Western Chemical Co, 714 Washington St, Kansas City, Mo.
Chloramine Corp, 101 Park Ave, New York, N. Y.
Wallace & Tiernan Co, Bellville, N. J.

WATTHOUR METERS

General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Sangamo Electric Co, Springfield, Ill.

WATTMETERS

General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Weston Electrical Instrument Corp, 614 Frelinghuysen Ave, Newark, N. J.
Bristol Co, Waterbury, Conn.
Esterline Angus Co, Box 596, Indianapolis, Ind.
Roller-Smith Co, 1766 W Market St, Bethlehem, Pa.

WELDING AND CUTTING OUTFITS, ACETYLENE

Linde Air Products Co, 30 E 42nd St, New York, N. Y.
Air Reduction Sales Co, 60 E 42nd St, New York, N. Y.
Bastian-Blessing Co, E Ontario St, Chicago, Ill.
General Welding & Equipment Co, Cambridge, Mass.
Imperial Brass Mfg Co, Chicago, Ill.
Smith Welding Equipt Corp, 2633 4th St, S E, Minneapolis, Minn.
Torchweld Equipment Co, 1035 W Lake St, Chicago, Ill.
Victor Equipment Co, 846 Folsom St, San Francisco, Calif.
Weldcraft Equipment Co, 2623 Liberty Ave, Pittsburgh, Pa.

WELDING MACHINES, ELECTRIC

General Electric Co, Schenectady, N. Y.
Lincoln Electric Co, 12818 Coit Rd, Cleveland, Ohio
Westinghouse Electric & Mfg Co, E Pittsburgh, Pa.
Allen Mfg & Welding Co, Inc, Buffalo, N. Y.
Burke Electric Co, Erie, Pa.
Harnischfeger Corp, Milwaukee, Wis.
Hobart Bros Co, Troy, Ohio
Marquette Mfg Co, 409 Johnson St, N E, Minneapolis, Minn.
Smith Welding Equipt Corp, 2633 4th St, S E, Minneapolis
Weldcraft Equipment Co, 262 Liberty St, Pittsburgh, Pa.

WHISTLES, STEAM

Crane Co, 836 S Michigan Ave, Chicago, Ill.
Jarecki Mfg Co, Erie, Pa.
Lunkenheimer Co, Box 360, Annex Station, Cincinnati, Ohi
Powell, Wm, Co, Cincinnati,
Bass Foundry & Machine Co, Ft Wayne, Ind.
Crosby Steam Gage & Valve Co, 40 Church St, New York, N. Y.
Leslie Co, Lyndhurst, N. J.
Longergan, J F, Co, Race St, Philadelphia, Pa.
Lovsted, C M, & Co, Inc, Seattle, Wash.
Nathan Mfg Co, 250 Park Ave, New York, N. Y.

WINCHES, ELECTRIC

American Engrg Co, Aramingo Ave, Philadelphia, Pa.
Robins Conveying Belt Co, 15 Park Row, New York, N. Y.
Stephens-Adamson Mfg Co, 5 Ridgeway Ave, Aurora, Ill.
Bartlett & Snow, C O, Co, Cleveland, Ohio
Beebe Bros, Inc, 2724 6th Ave, Seattle, Wash.
Bridgeport Chain & Mfg Co, Bridgeport, Conn.
Chisholm-Moore Hoist Corp, 6015 Fremont Ave, Tonawanda, N. Y.
Gifford-Wood Co, 24 Hill St, Hudson, N. Y.
Harrington Co, 17th & Callowhill Sts, Philadelphia, Pa.
Lidgerwood Mfg Co, Elizabeth, N. J.
Shepard Niles Crane & Hoist Corp, 453 Schuyler Ave, Montour Falls, N. Y.

WIRE AND CABLE, ELECTRIC

General Electric Co, Schenectady, N. Y.
Graybar Electric Co, 420 Lexington Ave, New York, N. Y.
Roebling's, John A, Sons Co, 640 S Broad St, Trenton, N. J.
Adam, Frank, Electric Co, St. Louis, Mo.
Anaconda Wire & Cable Co, 25 Broadway, New York, N. Y.
Bishop Wire & Cable Corp, 420 25th St, New York, N. Y.
General Cable Corp, 420 Lexington Ave, New York, N. Y.
National Electric Products Corp, Fulton Bldg, Pittsburgh, Pa.
Phelps Dodge Copper Products Corp, 40 Wall, New York, N. Y.

WOOL, GLASS

Owens-Corning Fibreglas Co, Toledo, Ohio
Owens-Illinois Glass Co, Toledo, O.

WOOL, ROCK

Baldwin-Hill Co, 575 Klagg Ave, Trenton, N. J.
Carey, Philip, Co, Lockland, O.
Eagle-Picher Sales Co, P D 39, Temple Bar Bldg, Cincinnati, Ohio
Johns-Manville, 22 E 40th St, New York, N. Y.
Barrett Co, 40 Rector St, New York, N. Y.
Refractory & Insulation Corp, 381 4th Ave, New York, N. Y.
Standard Lime & Stone Co, 200 1st National Bank Bldg, Baltimore, Md.

WRENCHES

Roebling's, John A, Sons Co, Trenton, N. J.
Snap-on Tools Corp, Dept P-11, Kenosha, Wis.
Walworth Co, Inc, 60 E 42nd St, New York, N. Y.
Billings & Spencer Co, Hartford, Conn.
Blackhawk Mfg Co, Milwaukee
Bonney Forge & Tool Works, 718 N Meadow, Allentown, P
Millers Falls Co, 59 Wells St, Greenfield, Mass.
Sherman-Klove Co, 3535 West 47th St, Chicago, Ill.
Starrett, L S, Co, Athol, Mass
Williams, J H, & Co, 225 Lafayette St, New York, N. Y.

You Can Hold the Solution
IN THE PALM OF YOUR HAND!

"The Entirely Different Boiler and Engine Treatment"

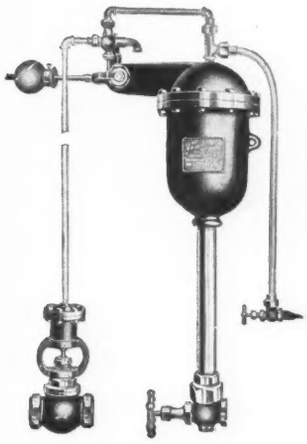
Since 1926 Sand-Banum has been keeping boilers and engines entirely free of scale and corrosion. Today, it is known and praised throughout the world. Every user has found this pure colloidal concentrate to be more efficient and more economical than any other method.

Not only is it SURE and SAFE but SO SIMPLE to handle, ship and store. Just think, it comes in 16-ounce cans—ready to use! A few ounces do a better job than hundreds of pounds of "ordinary boiler chemicals". Each can safely protects a 250 Hp. boiler for a month regardless of the operating conditions or the nature of the water used. It is ideal for processing industries because it does not carry over with the steam yet insures boiler and engine efficiency!

PROVE IT IN YOUR OWN EQUIPMENT—*before you pay for it!* Try Sand-Banum for 30, 60 or 90 days. Then if you are not entirely satisfied with results—YOU OWE US NOTHING!

AMERICAN SAND - BANUM CO., Inc.
9 Rockefeller Plaza — New York City
WESTERN SAND-BANUM CO.
Houston, Texas — Fresno, Calif.

SAFER OPERATION *and* A SAVING

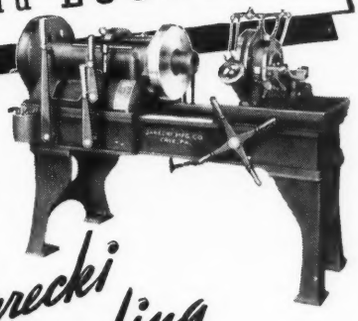


C-F "VIGILANT" Feed-Water REGULATOR

Better steam production is obtained from a boiler in which fluctuation of water level is prevented. This the "Vigilant" Feed Water Regulator will definitely accomplish. Not only lower fuel cost but safer operation results from this very simple precaution. The regulator is easily installed, automatic, unfailing. Ask for Bulletin 2514, also New Catalog of C-F Pressure Regulators.

The CHAPLIN FULTON MFG. CO.
28-40 PENN AVE. — CF — PITTSBURGH, PA.

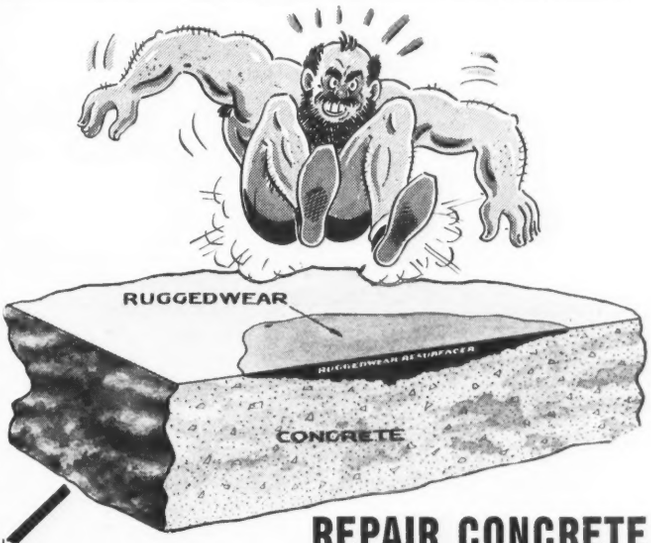
The Experience of hundreds of users is your assurance of the utmost in PERFORMANCE and ECONOMY



No machines in their class can be bought with more positive assurance of long, reliable threading service. Their performance record is your guide to accurate threads at low cost. Sizes up to 12" in standard and heavy-duty models. Distributors in principal cities.

Jarecki Pipe Threading Machines

JARECKI MFG. CO., ERIE, PA.



REPAIR CONCRETE
to a TOUGH *FEATHER* EDGE . . .

RUGGEDWEAR RESURFACER, made with Cellulose, may be used for patching concrete or over an entire area . . . indoors or out. No chopping or chipping required. Merely sweep out the spot to be repaired—mix the material—trowel it on. Holds solid and tight right up to the irregular concrete edge . . . leaves no joint or crevice to become chipped and filled with dirt. Provides a firmer, tougher, smoother, more rugged wearing surface. Dries fast. Costs only 10c to 14c per sq. ft. *Valuable, 60 Page "HANDBOOK of BUILDING MAINTENANCE" sent FREE to those requesting on business letterhead.*

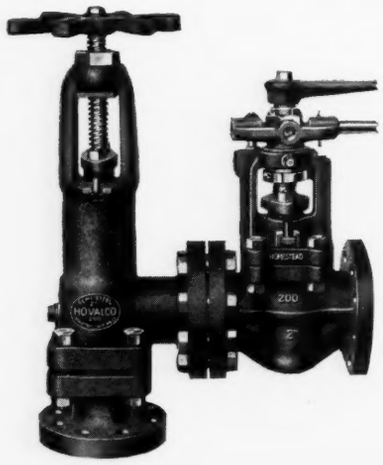
RUGGEDWEAR is the only Resurfacer made with CELLULOSE

MAKE THIS TEST!

FLEXROCK CO., 2377 Manning St., Philadelphia, Pa.
Please send me complete RUGGEDWARE information . . . details of FREE TRIAL OFFER—no obligation.

Name .....
Company .....
Address .....
City ..... *State* .....

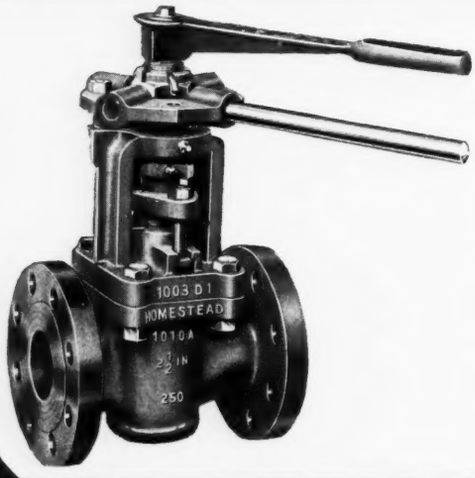
Three Ways TO GET VALVE SATISFACTION



Hovalco-Homestead Combination Boiler Blow-Off

● No greater satisfaction can come from a boiler blow-off valve than to know that when once installed it is going to last as long as the boiler itself. Here *is* an outstanding favorite in the power field—noted for long life, low cost service, with maximum safety. Spare seat and disc inside the Hovalco Angle Valve, plus protected seating surfaces of either of its quick opening companions—the "Lever-Seald" or "Cam-Seald" Plug Valves — assures this extremely long, low-cost service. Sizes 1½" to 2½"; semi-steel or cast steel for pressures to 600 pounds.

1



Homestead Lever-Seald Valves

● Here's a valve that positively cannot stick—opens or closes in quarter-turn—no lubrication required. Ends your valve worries on high temperature or high pressure services. Protected seating surfaces assure long life. Here's true "valve satisfaction" for a multiude of your tough valve jobs. Cast in semi-steel, steel, bronze, Monel, Ni-Resist, or acid resisting bronze; straightway, 3-way, or 4-way types for pressures up to 1500 pounds and corresponding temperatures.

2

3-Way and 4-Way Homestead Quarter-Turn Valves

● It's double economy and double satisfaction to use 3-way and 4-way Homestead Valves as flow-changers, or to control single or double-acting hydraulic pistons which travel their full stroke. You save in first cost, maintenance and operating time by requiring fewer valves and fittings. You save by getting Homestead's typical long, trouble-free, and extremely low cost per year operation. Made in "Lever-Seald" and "Cam-Seald" types for a wide range of temperature, pressure, and fluid conditions.

3

Ask for Reference Book No. 38 showing complete Homestead line; and for special prices on your quantity valve requirements.

Homestead Valve Mfg. Co.

P. O. Box 210 **Coraopolis, Penna.**

FOR EXTRA SAFETY

A wire rope developed to provide the ultimate in safe, saving service. The finest product of Roebling's unexcelled steel-making, research and rope-fabricating facilities!

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
BRANCHES IN PRINCIPAL CITIES

STRONGER—Wire of highest strength consistent with ductility and toughness

TOUGHER—Provides maximum resistance against wear, sudden shocks, vibration

SAFER—Unequalled for uniformity of quality

SAVING—Insures lowest general average operating cost

THE HIGHEST DEVELOPMENT IN ROEBLING WIRE ROPE

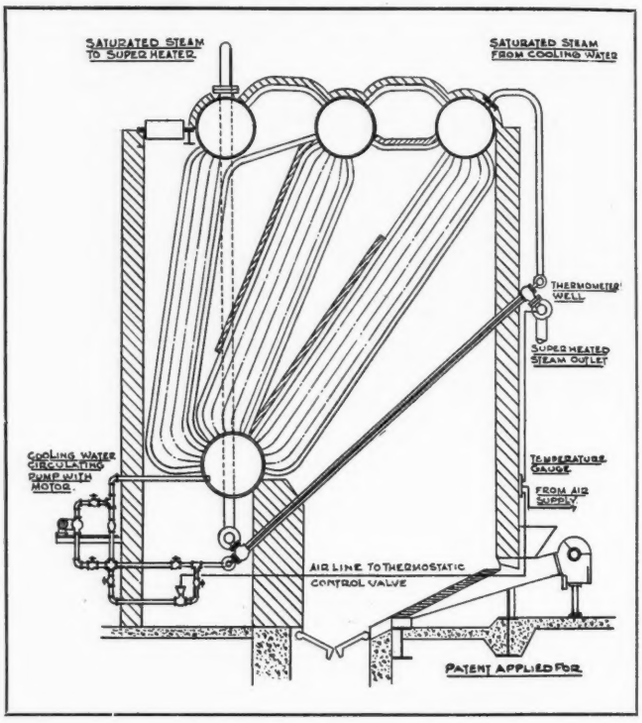
SUPERHEAT'S LATEST DEVELOPMENT

TO GIVE MORE POSITIVE AUTOMATIC CONTROL

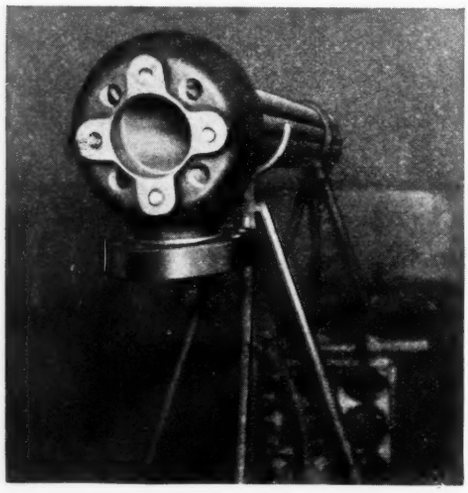
We have taken the Superheater out of the boiler and placed it in the combustion chamber where it belongs—away from the soot, where it does not interfere with the draft. We place it right in the radiant heat making the only true radiant heat Superheater.

This Water Regulated Superheater can be installed in any present boiler without changing tubes or setting and can be constructed for any pressure and temperature. It can be drained, cleaned and controlled. The controlling can be done automatically to give accurate temperature at any load on the boiler.

The water for the inside tube is supplied from the boiler through a centrifugal pump at about 30# excess pressure assuring positive circulation. The automatic control is shown on the boiler print on the right. The regulating water is discharged as steam into the top of the boiler.


SATURATED STEAM TO SUPER HEATER
SATURATED STEAM FROM COOLING WATER
THERMOMETER WELL
SUPER HEATED STEAM OUTLET
COOLING WATER CIRCULATING PUMP WITH MOTOR
TEMPERATURE GAUGE
FROM AIR SUPPLY
AIR LINE TO THERMOSTATIC CONTROL VALVE
PATENT APPLIED FOR

Cast Steel Head



HOW IT FUNCTIONS

The print below shows tubes

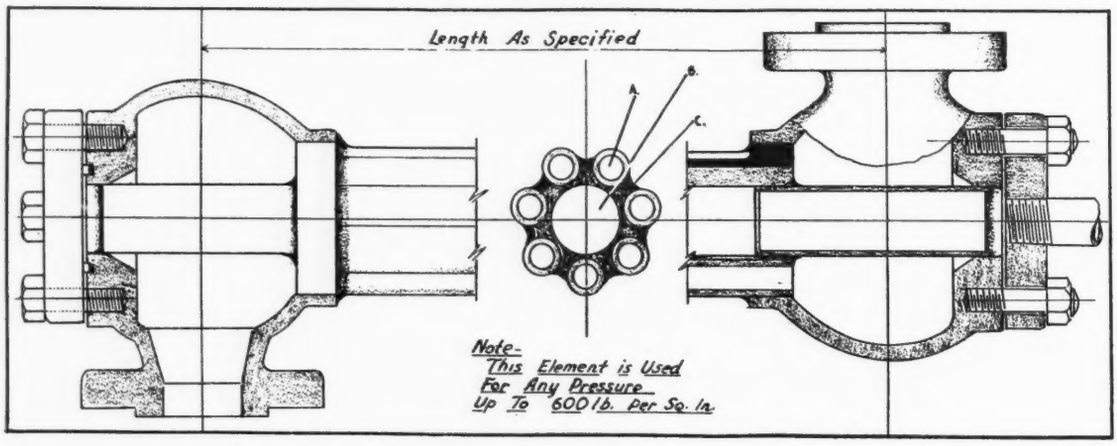
A—are steam tubes, and tube

B—a large tube for circulating water, and

C—are the pressure welds.

The inside tube is grooved to hold the steam tubes which are, in turn, welded into place making virtually one solid body of metal.

CROSS-SECTION OF A COMPLETE ELEMENT



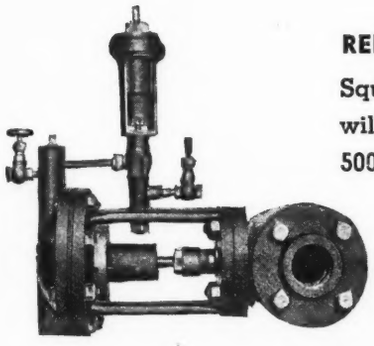
SUPERHEAT CONTROL CORPORATION

DIME BANK BUILDING • DETROIT, MICHIGAN

INSIST ON *THE GENUINE* Squires

TRAPS—

Genuine Squires Traps have held a reputation for long life and reliability for decades. Constantly improved to meet modern conditions.



REDUCING VALVES—

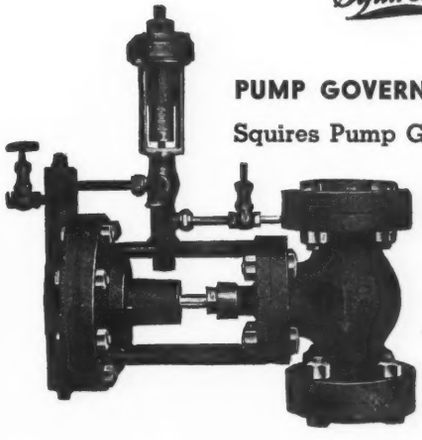
Squires Reducing Valves will reduce pressure from 500 lbs. to 1 oz. in one stage, if needed. Simple, sturdy, reliable. May be thermostatically operated. A positive dead end valve.

● Engineers of experience know they can rely on Squires Steam Specialties to do their job day in and day out through years of service. They rarely need maintenance, due to sound design and excellent manufacture. When they do, they are easy to adjust or repair.

Squires Steam Specialties have been a standard of quality for nearly four decades.

FEED WATER CONTROLLERS

Squires Feed Water Controllers will hold boiler water level at exact gauge. Feed follows demand closely, contributing much to good boiler operation. Simple—trouble free.



PUMP GOVERNORS—

Squires Pump Governors are sensitive, positive in action. Simple, sturdy—will give long service without attention.

We will send literature and prices on request

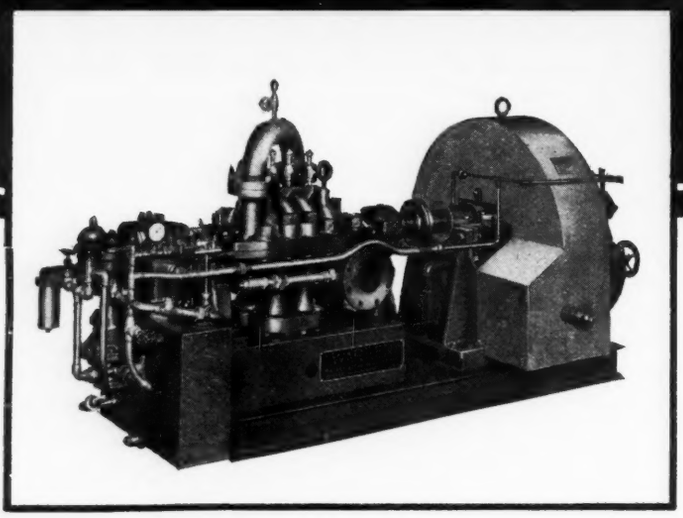
THE C. E. SQUIRES COMPANY

EAST 40TH AND KELLEY AVENUE • • • • CLEVELAND, OHIO

5 WARREN FEATURES

THAT HELP TO KEEP POWER COSTS DOWN

YEAR AFTER YEAR



Plant engineers and maintenance men know that rising pumping costs can seriously affect plant efficiency. And they know that long-term pumping economy must be based on sound details of design and construction. In Warren centrifugal pumps, for example . . .

SHAFTS are extra heavy to minimize wear and to prevent vibration and deflection in severest service.

BEARINGS are oversize, with large bearing surfaces that guard against wear and assure long service under severe operating conditions.

IMPELLERS are correctly designed to keep fluid velocities within limits proven to be most satisfactory by long experience in the field.

CASE RINGS have broad faces for long wear, and are easily replaced when necessary.

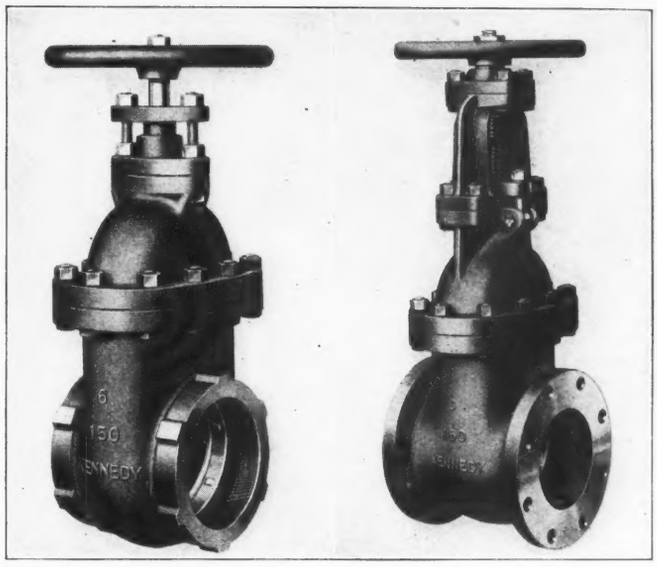
CLEARANCES between case and impeller rings are liberal to guard against wear and maintain high original efficiency over long periods.

On your next pump replacement or addition, plan for power operating and maintenance costs. Get a quote from Warren. Complete catalog on request.

WARREN PUMPS

WARREN STEAM PUMP COMPANY INC., WARREN, MASSACHUSETTS

Extra Values in VALVES and PIPE FITTINGS



for example . . . . in these

Kennedy Standard Iron-Body Wedge Gate Valves

KENNEDY

Products include

VALVES

Iron-Body and Bronze Gate, Globe, Angle and Check

PIPE FITTINGS

Malleable Iron and Bronze Screwed Fittings; Cast-Iron Flanged Fittings and Flanges

the metal is 50% stronger than ordinary cast iron, stems are bronze-bushed at all contact surfaces, stuffing box bolts and nuts are rust-proofed, all bolt heads and nuts have ample clearance for wrenches, no studs are used anywhere, special conveniences are provided for repacking . . . these and more 30 other "extra values" assure greater dependability, convenience of operation, and lower maintenance expense. Bulletin 50 tells the whole story—your copy sent on request.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

KENNEDY VALVES with Extra Value

THE CHEAPEST AND MOST DIRECT WAY TO ECONOMICAL SERVICE IS TO USE PACKINGS THAT LAST • IT'S THE REPACKING THAT MAKES FOR TROUBLE AND EXPENSE •

THE REAL COST OF A PACKING

is determined by its

LENGTH OF LIFE IN SERVICE

and

Its Effect on Rod or Shaft

Select a Packing Suited to the Conditions of Service

Each of our packings is so adapted to the service under which it must work that it can be depended upon to give long satisfactory service. Each packing is internally lubricated.

For All Steam and Compressed Air.

For Water, Calcium Brine, Centrifugal and Reciprocating Pumps.

For Caustic Soda, and All Alkalis.

For Sulphuric, Nitric and All Corrosive Acids.

For Gasoline, Naptha and All Distillates of Petroleum, and Fuel Oils.

Send for ABC Chart of Recommendations.

Working Samples on Request.

GREENE, TWEED & CO.

SOLE MANUFACTURERS

101 PARK AVENUE NEW YORK

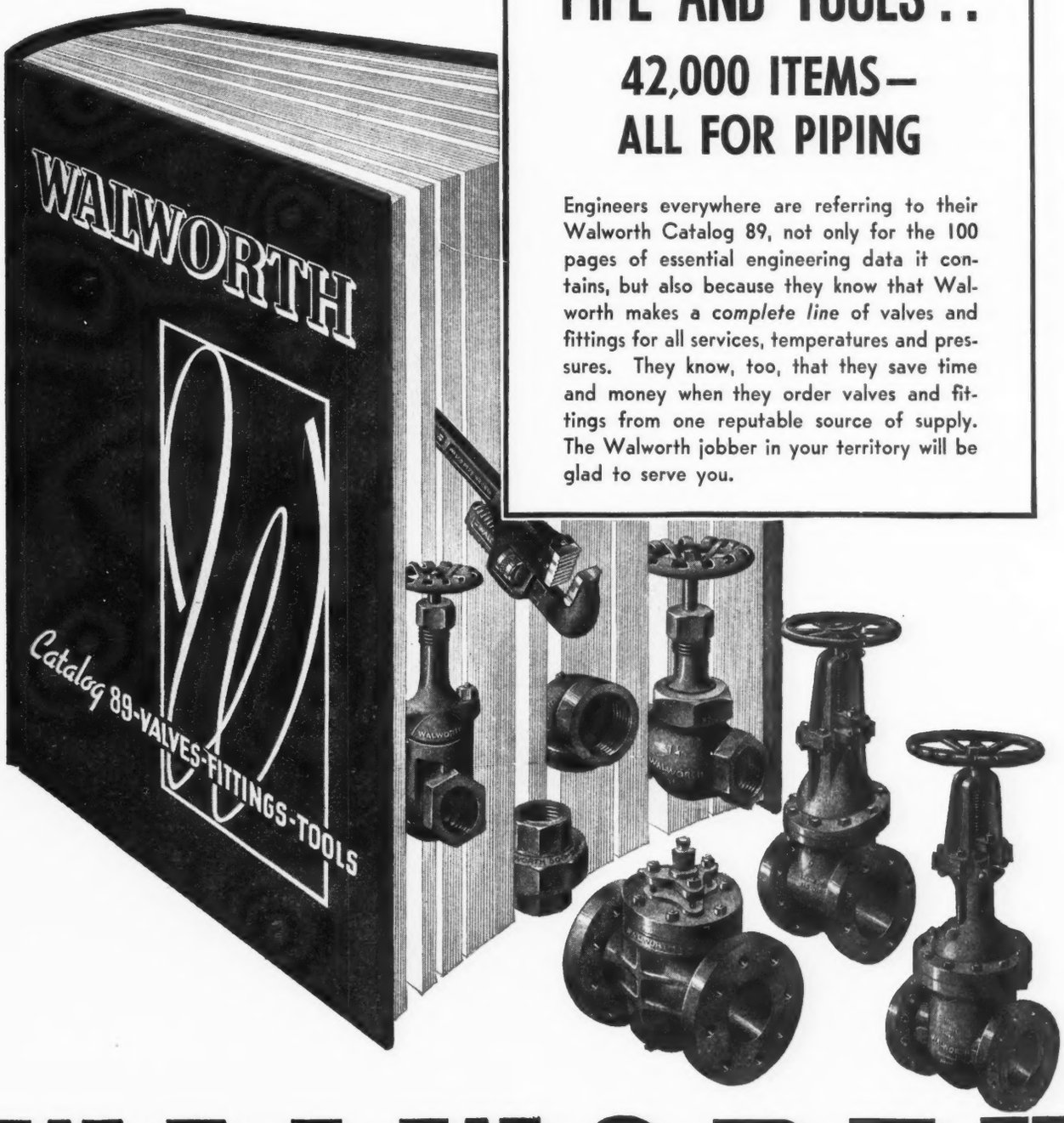
Complete data . . . . AT YOUR

FINGER-TIPS ON . .

VALVES, FITTINGS, PIPE AND TOOLS . .

42,000 ITEMS— ALL FOR PIPING

Engineers everywhere are referring to their Walworth Catalog 89, not only for the 100 pages of essential engineering data it contains, but also because they know that Walworth makes a *complete line* of valves and fittings for all services, temperatures and pressures. They know, too, that they save time and money when they order valves and fittings from one reputable source of supply. The Walworth jobber in your territory will be glad to serve you.



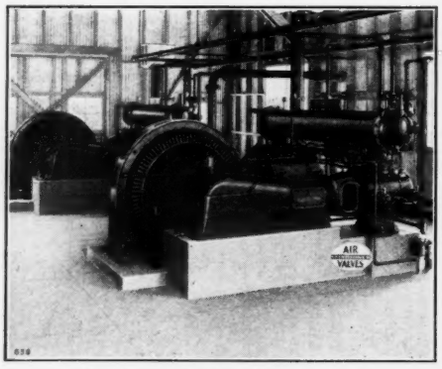
WALWORTH

WALWORTH COMPANY
60 EAST 42nd STREET, NEW YORK

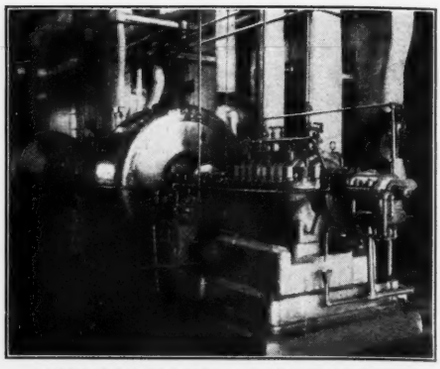
VALVES FITTINGS and TOOLS
Backed by 97 Years' Service

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

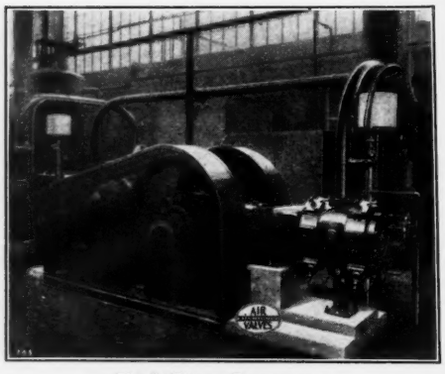
PUMPS and Compressors for the Power Plant Industry



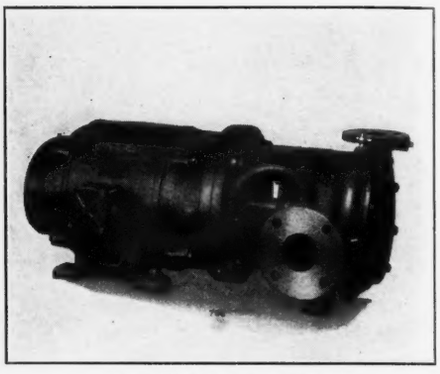
Two-Stage Duplex Compressors



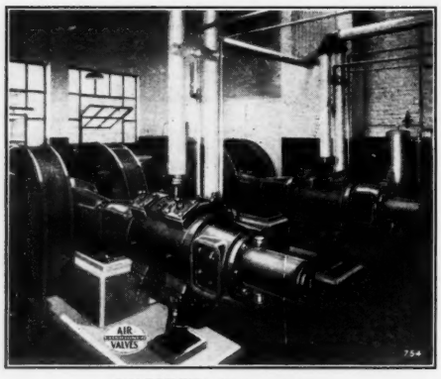
THRUSTFRE Multi-Stage Boiler Feed Pump



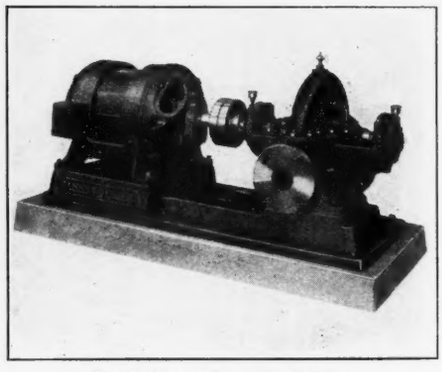
Single-Stage Compressor



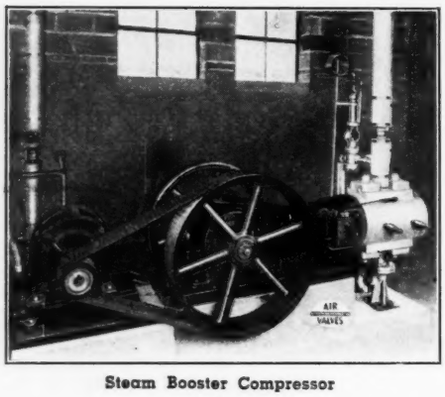
Penn-Motor Pumping Unit



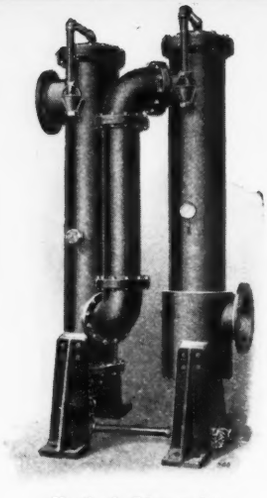
OILFREAIR Compressors



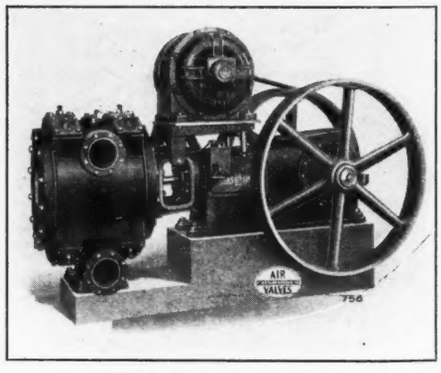
Single-Stage Centrifugal Pump



Steam Booster Compressor



Vertical Aftercooler



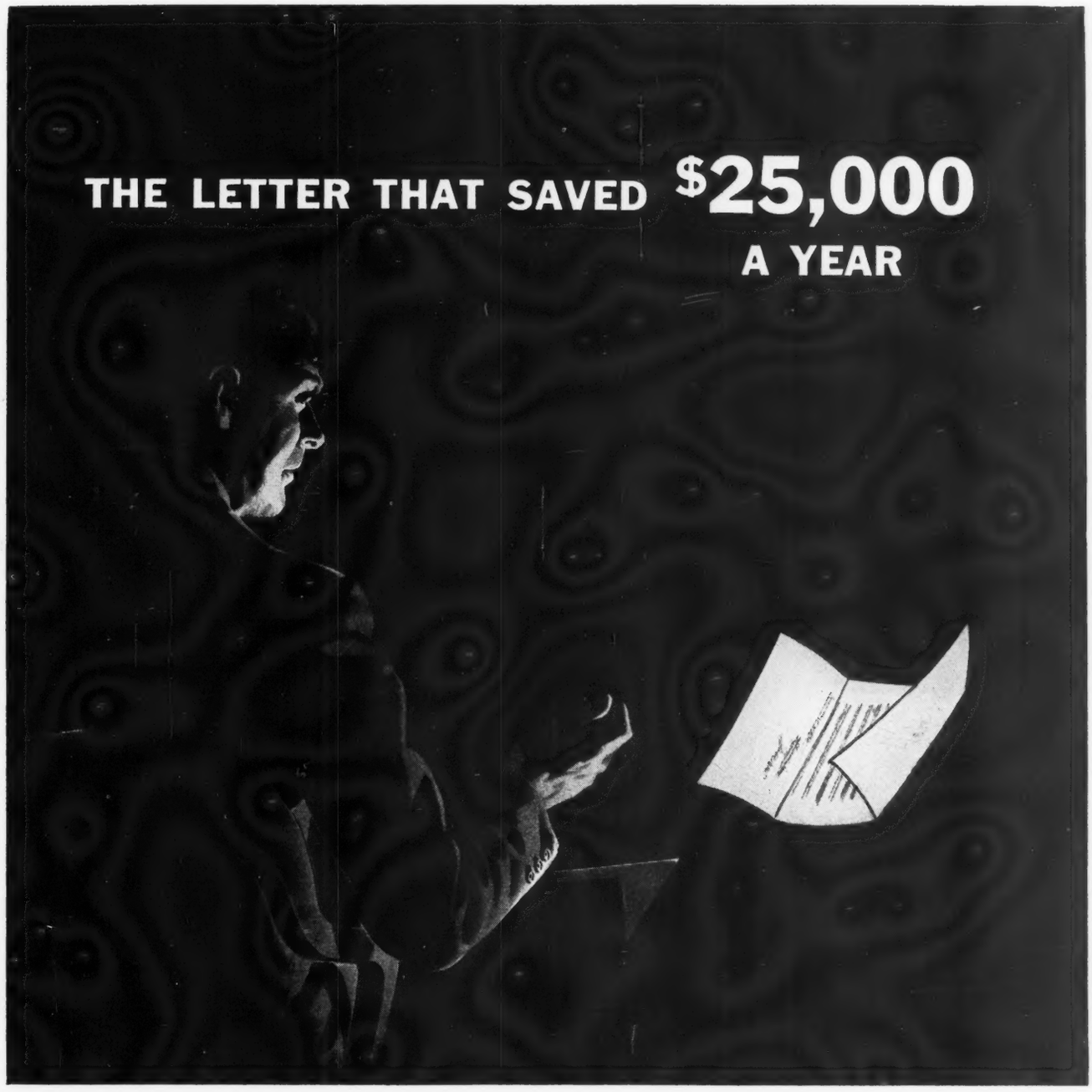
Single-Stage Vacuum Pump

PENNSYLVANIA PPC

PUMP & COMPRESSOR CO.

MAIN OFFICE & WORKS, EASTON, PA.

THE LETTER THAT SAVED $25,000 A YEAR



THERE was that stack of mail demanding his attention, and he with a thousand things to do. He reached testily for the first letter in the pile—"Another ad . . ."

The letter was half-way to the waste basket when a phrase caught his eye—"higher taxes, increased labor and material costs . . . greater profits." It didn't make sense.

Still incredulous, he read the letter through. Then he grudgingly filled out a return postcard—tossed it into his mail basket.

The postcard called for a free survey of his plant . . . to show where operating costs could be reduced. The survey was made. And as a result of it, automatic controls were installed throughout the plant.

A year later he was reporting to the board of directors: "Gentlemen, those Taylor Automatic Controls we installed as a result of their survey saved us this year exactly $25,347."

* * *

THIS STORY is typical of the way Taylor is helping industry to overcome the problems of today—the problems of higher taxes, of increased material and labor costs.

For Taylor shows you how to attack the one cost which you can reduce—operating cost.

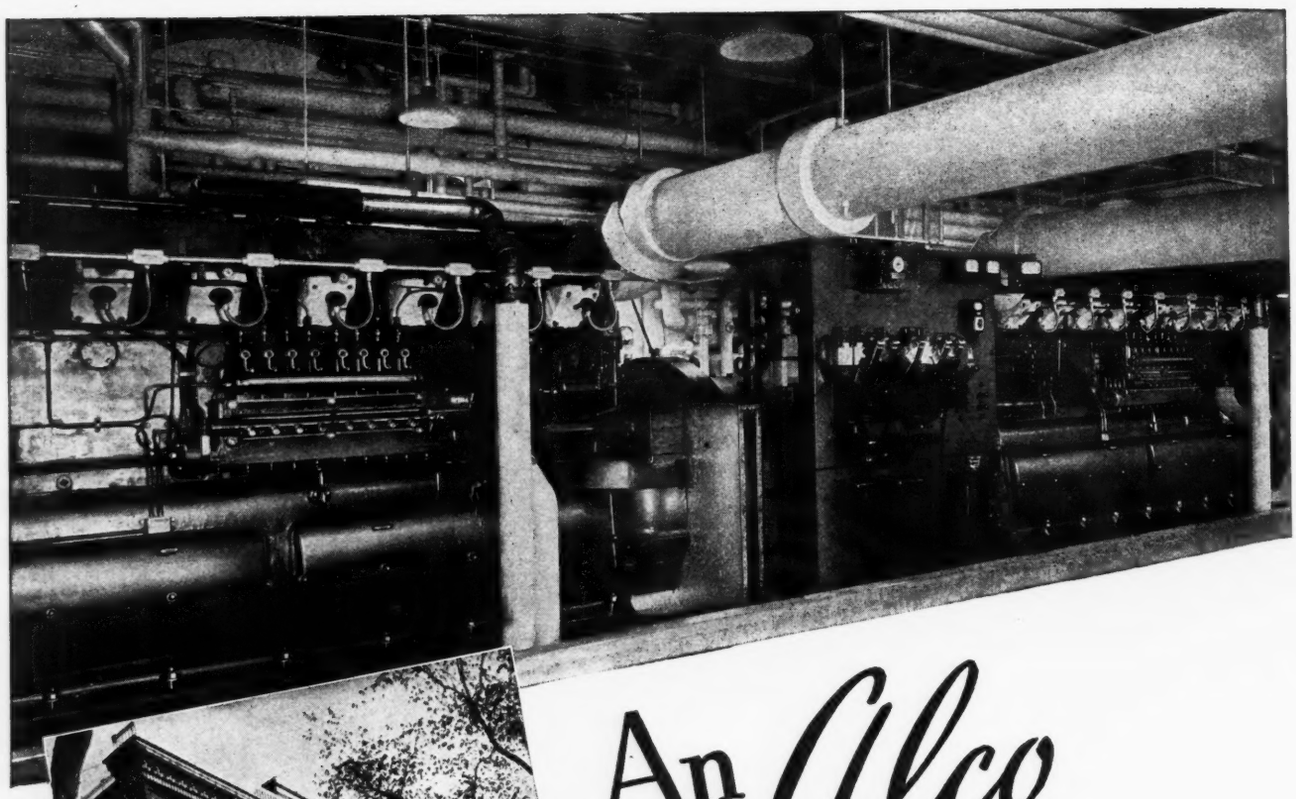
Taylor Automatic Controls can insure the uniformity of your product . . . can reduce spoilage and speed production. This means more sales and greater profits for you.

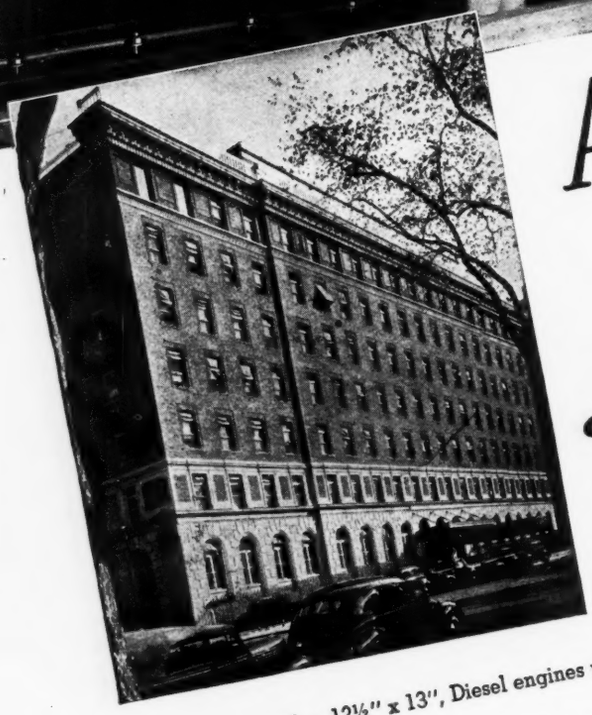
Write today for a Taylor man to make a free survey of your plant. No obligation, of course. The Taylor Instrument Companies, Rochester, N.Y. Plant also in Toronto, Canada. Manufacturers in Great Britain: Short & Mason, Ltd., London, England.

Taylor

Indicating | Recording • Controlling

TEMPERATURE, PRESSURE, FLOW
and **LEVEL INSTRUMENTS**





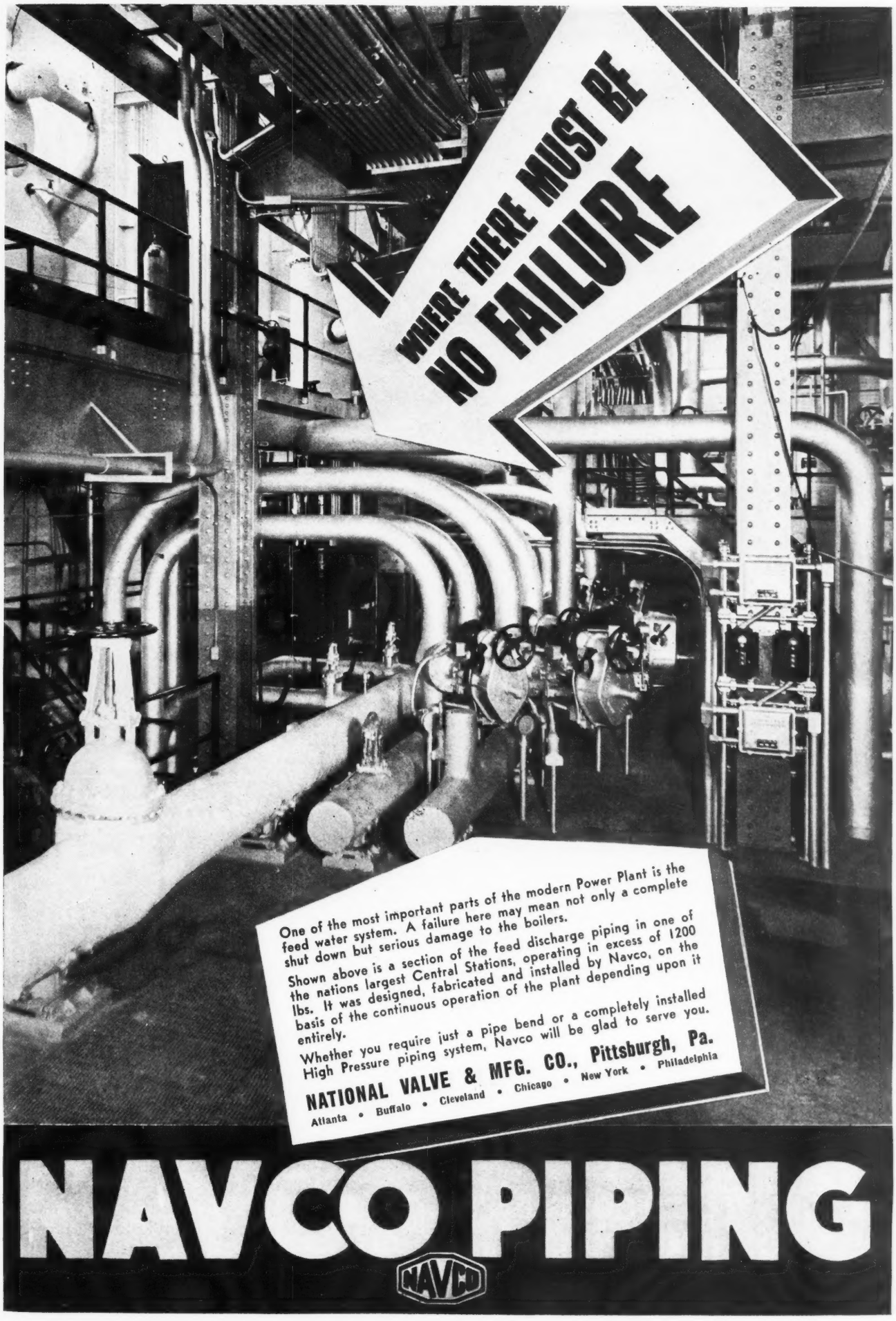
An Alco Diesel FOR UNIVERSAL APPLICATION

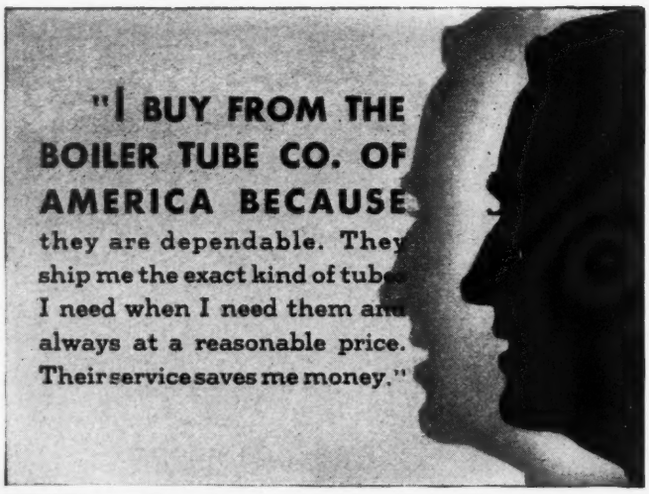
Two Alco, 8 cylinder, 12½" x 13", Diesel engines were recently put in operation at Mt. Sinai Hospital, located on Fifth Avenue, New York City.

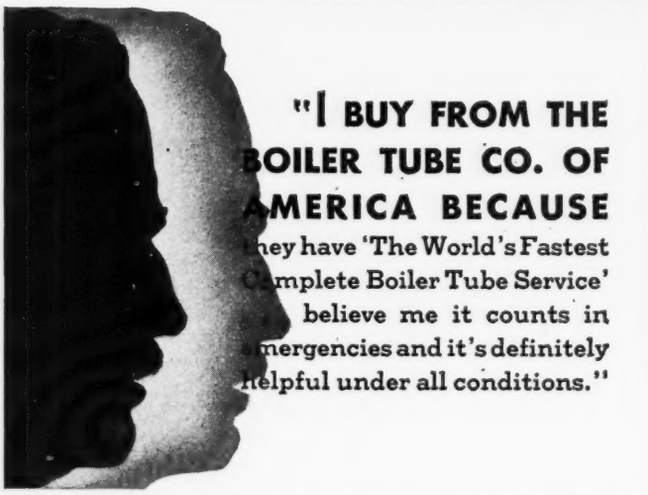
The outstanding requirements of this installation were COMPACTNESS, to suit available space; QUIETNESS, so as not to annoy patients or neighbors — the engines are installed immediately alongside of windows opening onto the street; DEPENDABILITY and ECONOMY — this installation must operate under the most exacting demands and at the same time compete with steam-generated and purchased current.

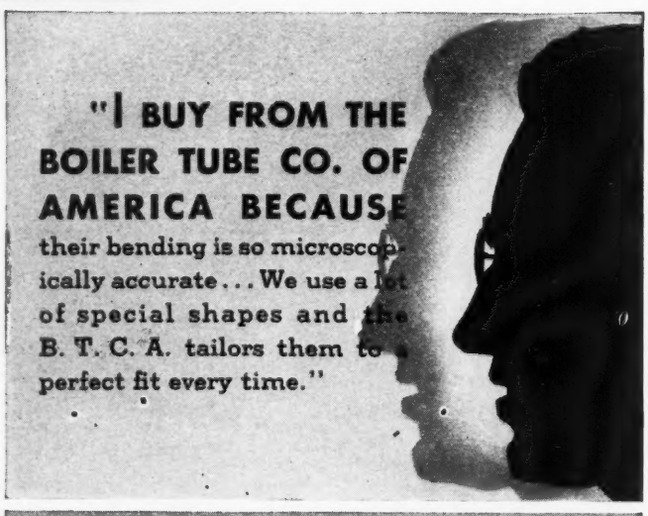
This Alco Diesel, due to its exceptional flexibility, is eminently suitable for many services. It is in successful operation in Tankers, Tug Boats, Cutters, Hydraulic Dredges, Cargo Vessels, Power Plants, Irrigation, Oil Pipe Lines, and Railway Motive Power.

DIESEL ENGINE DIVISION **AMERICAN LOCOMOTIVE COMPANY** AUBURN · NEW YORK ·


WHERE THERE MUST BE
NO FAILURE
One of the most important parts of the modern Power Plant is the feed water system. A failure here may mean not only a complete shut down but serious damage to the boilers.
Shown above is a section of the feed discharge piping in one of the nations largest Central Stations, operating in excess of 1200 lbs. It was designed, fabricated and installed by Navco, on the basis of the continuous operation of the plant depending upon it entirely.
Whether you require just a pipe bend or a completely installed High Pressure piping system, Navco will be glad to serve you.
NATIONAL VALVE & MFG. CO., Pittsburgh, Pa.
Atlanta • Buffalo • Cleveland • Chicago • New York • Philadelphia
NAVCO PIPING
NAVCO


"I BUY FROM THE BOILER TUBE CO. OF AMERICA BECAUSE they are dependable. They ship me the exact kind of tube I need when I need them and always at a reasonable price. Their service saves me money."


"I BUY FROM THE BOILER TUBE CO. OF AMERICA BECAUSE they have 'The World's Fastest Complete Boiler Tube Service' believe me it counts in emergencies and it's definitely helpful under all conditions."

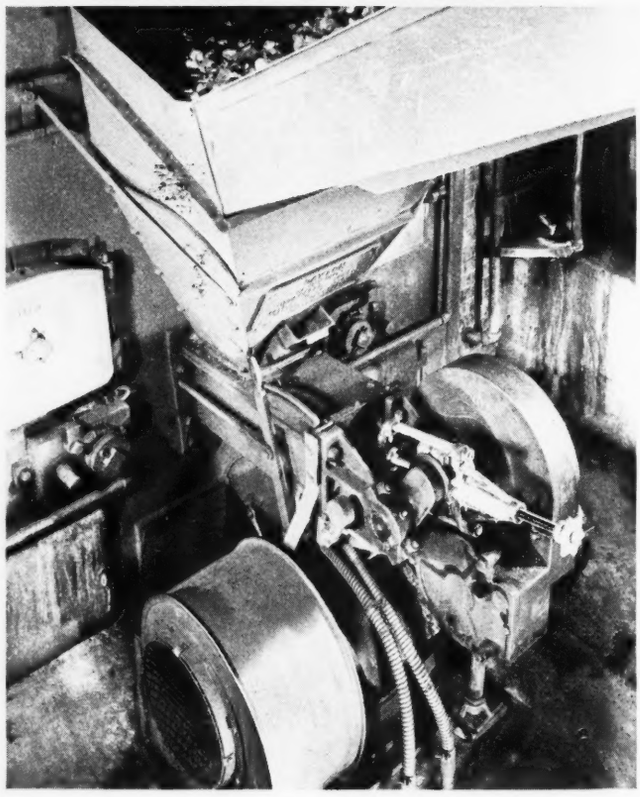

"I BUY FROM THE BOILER TUBE CO. OF AMERICA BECAUSE their bending is so microscopically accurate... We use a lot of special shapes and the B. T. C. A. tailors them to a perfect fit every time."

★ Customers may vary in their opinions as to why it pays to buy from us but it usually boils down to the fact that fast, accurate service is easy because of our superior facilities. Write us for quotation.

BOILER TUBE COMPANY OF AMERICA

Main Office & Works, 3126 Preble Ave., Pittsburgh, Pa.

NEW YORK PHILADELPHIA CHICAGO



"In our business Combustioneer is vitally important because it holds the load so that there's no variation in steam pressure. More than that, Combustioneer makes big savings in fuel costs, reduces labor, and eliminates smoke. And, we also praise Combustioneer because of its remarkably low upkeep cost."

Combustioneer Ram Feed Stokers are made in a wide variety of widths and lengths — adaptable to low set heating and power boilers. Write for further information to

COMBUSTIONEER DIVISION
THE STEEL PRODUCTS ENGINEERING CO.
122 Dakota Ave. SPRINGFIELD, OHIO

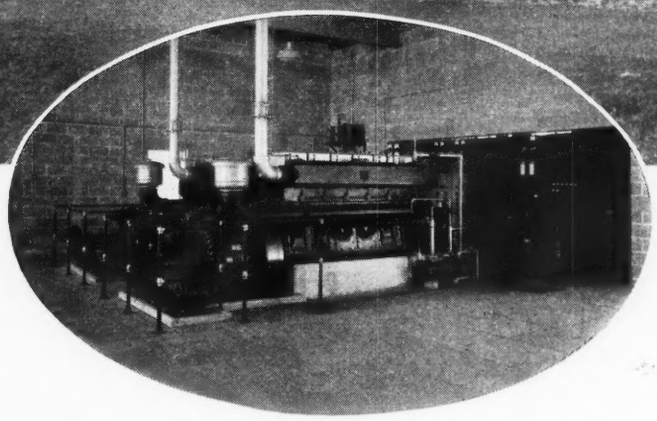
RURAL ELECTRIFICATION IN FLORIDA WITH SUPERIOR DIESELS

Superior DIESELS

HEAVY DUTY MODELS: 50 to 810 H. P., 250 to 720 R. P. M.

HIGH SPEED MODELS: 15 to 230 H. P., 900 to 1800 R. P. M.

This ultra-modern building, designed by Mr. Rowland Wank, Consulting Architect for the TVA, houses the new generating station of the Clay Electric Co-operative Association, Inc., Keystone Heights, Florida.



Two 150 KW Superior Diesel engine generating sets are in the station designed by Consulting Engineer, Mr. A. P. Michaels, of Orlando, Florida.

FIRST month's operation shows a total generating cost of $0.009 per KWH with a plant running-capacity factor of only 21%.

When the full load is on this plant and labor charges distributed over the greater plant output, generating cost will really be low. The 1200 available customers served by the 545 miles of lines in nine counties of the agricultural district surrounding Keystone Heights will begin to appreciate the splendid work which R.E.A. is doing in so many of the rural sections by bringing to them lower electric rates than those enjoyed by many city dwellers.

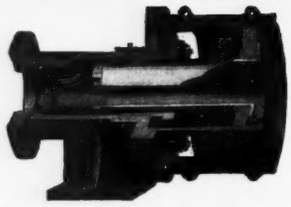
It should be remembered that this would not be possible without Diesel engines which are so well adapted for high operating economy in small isolated stations.

THE NATIONAL SUPPLY COMPANY . . . SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. · SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Cal.; Jacksonville, Fla.; Houston, Texas

ADSCO INTERNALLY-EXTERNALLY GUIDED JOINT

MOST COMPLETELY GUIDED, DEPENDABLE SLIP TYPE JOINT



Important Features

Internal Guide on Slip
External Guide in Hood
No metal to metal contact between slip and body
Semi-steel or Cast Steel Body
Bronze or Chromium plated steel slip
Properly proportioned stuffing box
Available in various sizes for high pressures and temperatures
Lubrication Fittings

Slip is DOUBLE GUIDED Throughout Entire Traverse

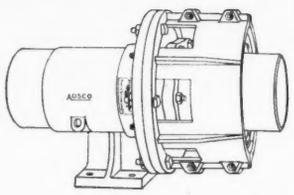
Packing can be lubricated under pressure

Internal and external guides insure true, axial slip guidance throughout entire traverse without metal contact between slip and body. External guide hood protects polished slip surface from dirt or damage. Openings in two-piece hood permit of packing gland adjustment when required.

A properly proportioned stuffing box is provided to accommodate ample packing for high pressure and high temperature operation and the packing can be lubricated under pressure through Alemite fittings to keep packing pliable.

Hundreds of these joints are in daily service in federal, state and municipal departments, public utilities, colleges, institutions and industrial plants.

Write for Bulletin No. 35-20PR



Made with Beveled Ends for Welding

This joint can be supplied in single and double slip types with or without anchor base and service connections with beveled ends for use in welded steam or hot water pipe line installations as illustrated above.

AMERICAN DISTRICT STEAM COMPANY

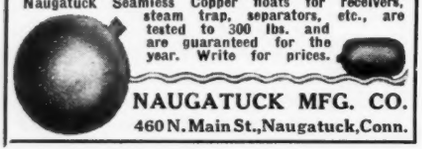
NORTH TONAWANDA, N.Y.
IN BUSINESS OVER SIXTY YEARS

WHERE TO BUY

SUPPLEMENT

Featuring additional products and specialties for power plants

SEAMLESS COPPER FLOATS THAT SAVE MONEY
Naugatuck Seamless Copper floats for receivers, steam trap, separators, etc., are tested to 300 lbs. and are guaranteed for the year. Write for prices.



NAUGATUCK MFG. CO.
460 N. Main St., Naugatuck, Conn.

"MONO"
BOILER BAFFLES
HIGH TEMPERATURE
REFRACTORY CEMENTS
SANFORD C. SMITH REFRACTORIES, INC.
1715 NIAGARA St., Buffalo, N. Y.

THE ORIGINAL
Tripp Metallic Packing
TRIPP METALLIC PACKING CO.
BOSTON MASS.

MAKE YOUR OWN BOILER REPAIRS
WITH
BRIXPLASTIC
MOLDABLE FURNACE LINING
(High Heat Test)
Shipped Ready To Use — In 100 Pound Cartons or 700 Pound Drums
The Inland Fire Brick Company
3101-43 Berea Road Cleveland, Ohio

THE Where To Buy Section of Power supplements other advertising in this issue with these additional announcements of products and services essential to modern Power plant operation. Make a habit of checking this page each issue.

THE PURE OIL CO.

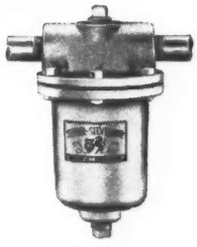
PURE THREE POINT LUBRICATION • A Complete Line of Industrial Petroleum Products

THE PURE OIL COMPANY, U.S.A. — PURE — APPLICATION ENGINEERING INDUSTRIAL DEPT. — THREE POINT SERVICE — CRUDE

Ask a Pure Oil Engineer to help solve your lubrication problems

CHICAGO, U.S.A.

FOR SNAP ACTION HEAT — INSTANT HEAT — all entrained air must be removed in one quick *Phtt!* Get this speedy action on your heating and process units. Drain them with Anderson Super-Silvertop steam traps equipped with snap action air eliminators.



These steam saving eliminators immediately remove all entrained air from the system when steam is first turned on. The Super-Silvertop inverted bucket steam trap removes the condensate as fast as it forms. That means the system is filled at once with hot, dry steam that goes right to work.

Don't be without these time-saving, dollar-saving steam traps —put them to work in your plant for greater, lasting efficiencies. Write today for further facts about snap action heat.

THE V. D. ANDERSON COMPANY
1934 WEST 96TH STREET • CLEVELAND, OHIO

Super-Silvertop STEAM TRAPS

Another Solution to POWER SHORTAGE...

Powerful and flexible cleaner for short bends in curved tubes.

Sturdily built cleaner for straight tubes using expansion type cutter head.

AIRETOOL CLEANERS
For Boilers and Condensers

● Industry is facing a very serious shortage of steam power today. As a result, every live boiler is being pushed to new capacities. Are they taking these loads safely, economically? Not if there is scale on the heating or cooling surfaces.

What are the most satisfactory solutions? One way we are sure of it is to use a tube cleaner that is different . . . the AIRETOOL . . . the tube cleaner that gets *all* the scale. Bulletin No. 13 illustrates and describes the complete line of boiler and condenser tube cleaners. Write for your copy *now*.

The* AIRETOOL MFG. *Co.

300 Center St. **Springfield, Ohio**

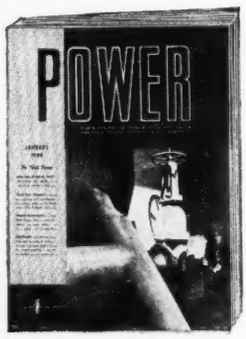
YOUR ANSWER *to successful heat exchanger cleaning*

Restoring heat transfer capacity to heat exchanger equipment is easy, when you clean the Oakite way. By simply circulating through the system a solution of the recommended Oakite material you can remove even tough, thick layers of carbonaceous deposits. Oakite methods are fast as well as easy . . . help you get equipment back into service quickly.

Drop us a post card. Have us send you full information on your heat exchanger and other cleaning. No obligation.

Manufactured only by
OAKITE PRODUCTS, INC., 23 Thames St., New York
Representatives in All Principal Cities of the U. S.

OAKITE CERTIFIED CLEANING
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT



Geo. Edwards says

"It's Your Baby"

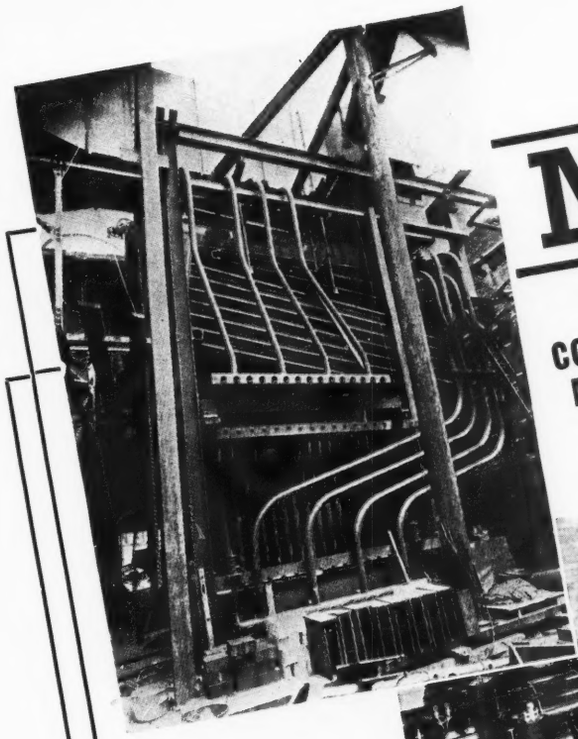
. . . Speaking of "The Operating Engineer", a sixteen-page practical section in this issue.

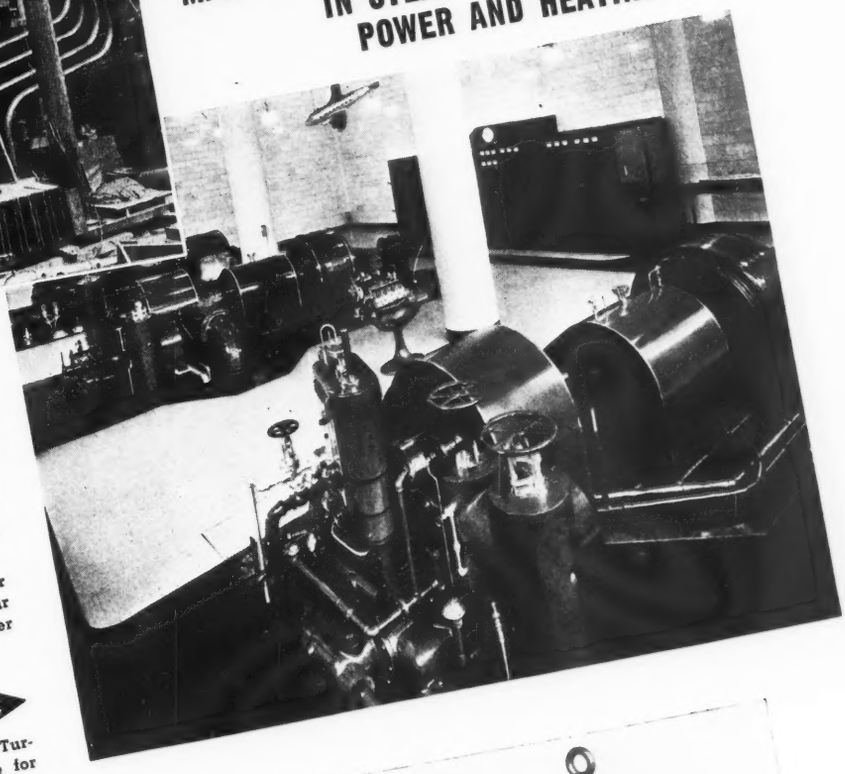
BE SURE TO READ IT

MURRAY

OFFERS

COMPLETE, PROMPT ENGINEERING — DESIGN — MANUFACTURING — INSTALLATION SERVICE — IN STEAM GENERATION — POWER AND HEATING





BOILERS

This Murray Type "A" boiler with Murray water walls—designed for the dependable and economical production of 30,000 pounds of steam per hour—typifies the kind of service Murray is prepared to render in steam generation.

Whether steam is required for power or heating, consult Murray on your needs and be assured of a proper solution to your problem.

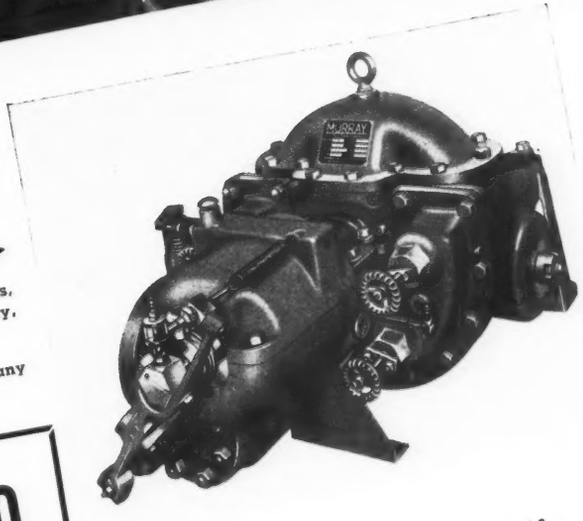
TURBINE GENERATORS

A typical installation of Murray Turbines. These units are available for generator and mechanical drives and assure low cost power. Murray Turbines are in extensive use in leading industrial, municipal, central station and institutional plants were dependable, efficient performance is of paramount importance.

MECHANICAL DRIVE TURBINES

Murray Type "U" Mechanical Drive Units for pumps, fans, or any mechanical drive where dependability, economy and durability are mandatory.

These Type "U" Turbines are in operation in many diversified fields of application.



VALUABLE ENGINEERING DATA

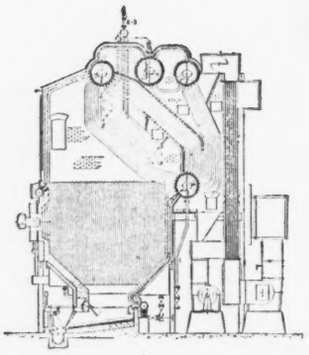
Valuable engineering data on Murray power plant equipment will be sent promptly on request.

MURRAY IRON WORKS CO.

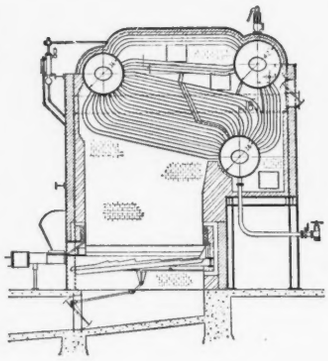
BURLINGTON . . . . . IOWA

Steam and Motor Driven Unit Heaters, Also, Corliss Engines, Grey Iron Castings.

EDGE MOOR

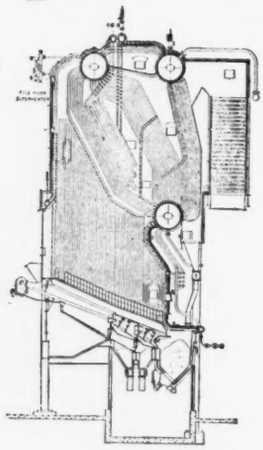


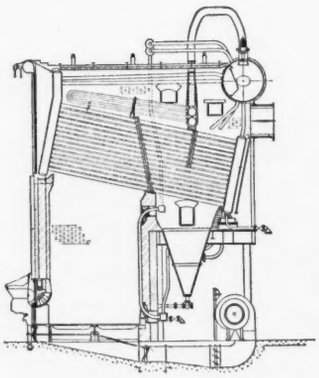
WATER-TUBE BOILERS
FOR
ANY CAPACITY AND PRESSURE



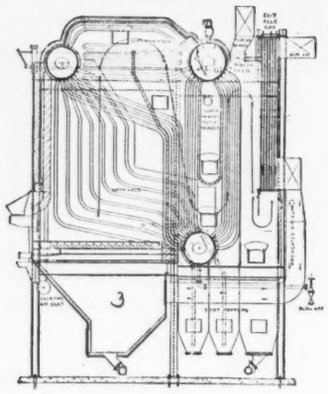
Cross-section illustrations shown here are those of actual Edge Moor installations and are typical of the boiler plants designed, built, and placed in operation by Edge Moor.

In each of these modern plants, a high proportion of Edge Moor built equipment is included. Drums, for example, are welded in Edge Moor's own shop—tubes are formed at our own plant on special equipment. In addition, superheaters, complete water walls, economizers, air preheaters, boiler casings and other steel work are fabricated in the Edge Moor shop.

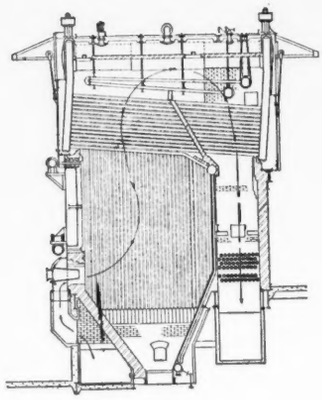




COMPLETE POWER PLANT ENGINEERING SERVICE



Edge Moor is prepared to furnish and erect any or all major items of boiler plant equipment and handle the work under a single contract. Our engineering service includes the studying of specific operating conditions. We draw freely from our long experience in this specialized field of engineering in making our recommendations and furnishing without prejudice the properly engineered equipment for each individual requirement. We are prepared to furnish also such equipment as that required for fuel preparation, furnaces, tube cleaning, control, draft and other important equipment required in modern boiler plant installation.



RECENT EDGE MOOR INSTALLATIONS

GUNTHER BREWING CO.
SYLVANIA INDUSTRIAL CORP.
ALBERMARLE PAPER MFG. CO.
ATLAS POWDER CO.
CHAMPION INTERNATIONAL CO.
WOODWARD & LATHROP
SWIFT & COMPANY
LASALLE-MADISON HOTEL

Ask Edge Moor for detailed engineering information on boilers and boiler equipment. Take advantage of Edge Moor's long experience and modern engineering to insure the maximum operating efficiency and economy and the minimum maintenance for your boiler plant.

Bent Tube Boilers
Straight Tube Boilers
Waste Heat Boilers
Superheaters
Water Walls
Economizers
Air Preheaters

EDGE MOOR IRON WORKS, INC. 30 Rockefeller Plaza, New York, N. Y.

Kansas City Chicago Detroit Richmond, Va.

In Canada UNITED STEEL CORPORATION, LTD. Toronto Montreal

Finishing touches to welded Buffalo Induced Draft Fan housing. Note fan in background with section of housing removed.

Does the Housing matter?—

Aside from the elementary necessity for a correctly proportioned housing, it is mighty important to the user that the fan housing be properly built.

Draft service is hard on housings—that's why we build them heavy. For forced draft fans where clean air is handled, an all-welded housing is a good investment. On induced draft service, where scroll liners are frequently used, it is advisable to use a bolted-scroll construction, welding certain other portions of the housing.

In either case, you'll find that Buffalo engineers will recommend the construction which will give you the best service. Heavy steel plate scroll sheet is built in sections of convenient size; outside scroll angles are bolted to side sheets and welded to scroll sheet. Weld and asbestos gaskets provide dust and gas-tight joints.

Bulletin 3190 gives full details of this construction. Send for your copy.

WRITE FOR BULLETIN 3190

"Buffalo"

BUFFALO FORGE COMPANY

488 Broadway, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Forced and Induced DRAFT FANS

SHE'S helping others to health! And you can too . . . if you resolve right now to mail no letter—send no package—unless it is decorated with the Christmas symbol that saves lives.

Since 1907, the annual sale of Christmas Seals has helped to support the campaign to eradicate tuberculosis in the United States.

During these years of concentrated effort, the death rate from tuberculosis has been cut three-quarters! Yet, tuberculosis still kills more people between the ages of 15 and 45 *than any other disease!*

No home is safe from tuberculosis until *all* homes are safe.

BUY CHRISTMAS SEALS

The National, State and Local Tuberculosis Associations in the United States

SEARCHLIGHT SECTION

POWER

WHERE-TO-BUY

USED POWER EQUIPMENT

and Accessories

Steam, Gas, Oil, and Electric

The numbers appearing under a classification identify advertisers so numbered in the Alphabetical Index.

AIR COMPRESSORS—2, 5, 7, 8, 16, 18, 19, 21, 27, 28, 39, 40, 41, 42, 44, 51, 59, 60, 63, 66, 67

AIR CONDITIONING EQUIPMENT—63

ALTERNATORS—25

BLOWERS—18, 41, 51, 53

BOILERS—1, 3, 6, 7, 10, 17, 18, 20, 27, 30, 36, 38, 39, 43, 49, 51, 55, 57, 58, 60, 64

BOILER PLANTS—57, 58

BRAKES—42

CAPACITORS—61

CIRCUIT BREAKERS—12, 25, 33, 61

COMPENSATORS—25, 33

CONDENSERS—60

CONTROLLERS—23, 33, 42

CONVERTERS—7, 11, 16, 21, 29, 33, 40, 44, 62, 63, 66, 68

CRANES—21, 39, 42, 44, 60

ELECTRICAL INSTRUMENTS—65

ENGINES

(Steam-Gas-Oil)—5, 6, 7, 8, 9, 13, 18, 30, 33, 37, 38, 43, 57, 58, 60, 61, 62, 63, 64, 66, 67, 68

Diesel—18, 33, 37, 43, 45, 57, 61

FANS—29, 41, 51, 53

FOUNDRY EQUIPMENT—27

FREQUENCY CHANGERS—3, 7, 11, 29, 34, 41, 46, 68

GENERATORS—4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 16, 18, 21, 23, 24, 25, 27, 29, 30, 31, 33, 34, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 48, 50, 51, 53, 54, 55, 57, 58, 59, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70

GENERATOR SETS

Diesel Engine—4, 8, 33, 39, 43, 57, 59, 64

Engine—4, 10, 13, 14, 18, 21, 30, 33, 37, 44, 48, 51, 57, 66, 67, 69

Motor—3, 4, 6, 7, 8, 10, 11, 16, 18, 21, 24, 25, 27, 29, 30, 33, 34, 39, 40, 41, 43, 44, 45, 46, 47, 48, 50, 51, 53, 54, 55, 62, 63, 66, 67, 68, 69, 70

Turbo—4, 5, 7, 8, 10, 11, 14, 21, 27, 30, 31, 33, 39, 43, 44, 48, 51, 55, 58, 59, 61, 62, 63, 66, 68, 70

HEATERS—30

HOISTS—17, 41, 42, 44, 52, 54, 66

HOPPERS—6

ICE MACHINERY—37, 67

LOCOMOTIVES—45, 54

MACHINE TOOLS—18, 51

MOTORS—3, 4, 11, 16, 18, 21, 23, 25, 29, 33, 34, 39, 41, 42, 44, 45, 48, 50, 51, 53, 54, 55, 59, 61, 62, 63, 64, 65, 66, 67, 68

PIPE—32

PUMPS—6, 18, 21, 29, 39, 44, 51, 60, 63, 64, 65, 69

RECTIFIERS—3

REGULATORS—27

SWITCHES—12, 25

TRANSFORMERS—4, 7, 16, 18, 21, 25, 26, 29, 33, 34, 41, 43, 44, 54, 56, 59, 61, 62, 63, 65, 66, 68

TURBINES—3, 15, 30, 33, 34, 37, 49, 57, 60, 63, 69, 70

UTILITY PLANT EQUIPMENT MISC.—22

WATER TREATING PLANT—6

WELDERS—18, 41

Alphabetical Index to Advertisers

The number preceding an advertiser's name is used in Where-To-Buy to Identify this advertiser under each classification in which he is offering equipment.

ADVERTISERS No.	Name	PAGE No.
1	Acme Equipment Co. Inc., The	250
2	American Air Compressor Corp.	246
3	Archer & Baldwin, Inc.	251
4	Belyea Company, Inc.	244
5	Birch Manufacturing Co.	250
6	Brearley, H. P.	251
7	Brew, Woltman & Co., Inc.	239
8	Brill Equipment Corp.	250
9	Capital Ice Refrigerating Co. Inc.	251
10	Castle, James T.	251
11	Chicago Electric Company	245
12	Circuit Breaker Company	250
13	City Cleaning & Laundry	251
14	Consolidated Products Co., Inc.	248
15	Continental Salvage & Machy. Corp.	250
16	Crawbuck Company, John D.	247
17	Davis, J. F.	251
18	Delta Equipment Company	248
19	Denny & Clark	251
20	Douglass Company, Stephen A.	253
21	Duquesne Electric & Mfg. Co.	242
22	Ebasco Services Inc.	251
23	Electric Apparatus & Repair Co.	251
24	Electric Enterprise Company	250
25	Electric Equipment Company	245
26	Electric Service Company, Inc., The	248
27	Ellis Company, A. Lee	249
28	Emerman & Company, Louis E.	250
29	Erie Electric Motor Repair Co., Inc.	241
30	Fletcher Sales Company	242
31	General Steel Castings Corp.	251
32	Greenspon's Son Pipe Corp., Jos.	251
33	Hall & Company, Inc., Stephen	236
34	Hemphill & Company, Inc., J. L.	237
36	Hunt's Sons, M. J.	244
37	Industrial Equipment Co., Inc.	240
38	Interstate Power Equipment Co.	250
39	Iron & Steel Products, Inc.	248
40	Kirk Company, Inc., Wallace E.	249
41	Land & Company, L. J.	243
42	MacCabe Company, T. B.	246
43	Mississippi Valley Equipment Co.	248
44	Moorhead-Reitmeyer Co., Inc.	247
45	Morse Bros. Machinery Co.	250
46	Motor Repair & Mfg. Company, The	248
47	National Lead Company	250
48	National Power Machy. Co., The	249
49	Northern Indiana Power Co.	251
50	Northwestern Electric & Mchy. Co.	251
51	O'Brien Machinery Company, The	245
52	Orange Memorial Hospital	250
53	Pariser Electric Motor Co. Inc.	250
54	Penn Electrical Engineering Co.	244
55	Pensacola Company	251
56	Philadelphia Transformer Co.	251
57	Power Plant Equipment Co., Inc.	249
58	Rearick, Charles B.	250
59	Rockford Electric Equipment Co.	248
60	Ross Power Equipment Company	250
61	Sachsenmaier Company, George	249
62	Salzberg Company, Inc., H. E.	243
63	Scheinert, R.	247
64	Southern Machinery Company	250
65	Superior Electric Machinery Co.	250
66	Tippins Machinery Company	248
67	Tolbert Machinery Company, Bert.	249
68	Utilities Electrical Machinery Corp.	246
69	Washington Electric Company, Inc.	248
70	Wilms, Weaver & Company	238

SPECIAL OFFERING of MOTORS TRANSFORMERS GENERATORS

SWITCHBOARDS & CONTROL APPARATUS
STEAM & DIESEL ENGINE GENERATOR SETS
MOTOR GENERATOR SETS • TURBINES

All Equipment Rebuilt in Our Modern Plant.
An Engineering Staff to Analyze Your Particular Problem and Make Recommendations.

Slip Ring Motors 3 Ph., 60 Cy.

H.P.	Volts	Make	Speed
400	220–440	G.E.	900
300	220–440	G.E.	600
300	220–440	G.E.	450
300	2300–4000	G.E.	1200
200	2200–550	G.E.	1800
150	2200–440	Whse.	1800
150	2200–440–220	G.E.	600
100	220–440	G.E.	900
100	2200–550–440–220	G.E.	720
100	2200–440–220	G.E.	600
100	220–440	G.E. MTC	900
100	2200–550	G.E.	900
80	220–440	G.E. MTC	900
60	220–440	G.E. MTC	900
60	220–440	G.E.	900
60	220–440	G.E.	720
50	440–220	G.E.	1200
50	440–220	G.E.	900
50	220–440	G.E.	600
50	2200	G.E.-K.	1200
50	220–440	G.E.	720
40	220–440	G.E.	1800
40	220–440	G.E.	900

Squirrel Cage Motors

500	220/440	G.E.	IK	900
500	220/440	G.E.	IK	1200
400	2200–440–220	G.E.	KT	900
350	2200–440–220	G.E.	FT	400
220	550	Whse.	CS	720
150	2200–440–220	Whse.	CS	600
150	2200	G.E.	IK	1800
150	2200–550	Al. Chal.		450
125	220–440	G.E.	KT	720
100	440–220	G.E.	KT	900
100	2200–550	G.E.	KT	900
75	220–440	G.E.	KT	600
75	440	Whse.	CS	1200
60	220–440	G.E.	KT	900
60	220	G.E.	KT	720
50	220/440	G.E.	KT	900
50	220/440	G.E.	KT	600
40	220/440	G.E.	KT	1200

Synchronous Motors 3 Ph., 60 Cy.

H.P.	Volts	Make	Speed
600	2300	G.E.	1800
350	440–220	G.E.	900
300	440–220	G.E.	600
240	2300–550	G.E.	900
240	2200–440–220	G.E.	600
200	440–220	G.E.	720
125	220–440	G.E.	300
125	2300–4150	G.E.	900
120	220–440	G.E.	900
120	440–220	G.E.	1200
60	4150	Ideal	327
60	2200–440–220	G.E.	1200

A.C. Generators

1—312 KVA, 900 rpm—2200/550 V. Whse.
1—300 KVA, 600 rpm—220/440 V. G.E.
1—300 KVA, 514 rpm—2300 V. Whse.
1—225 KVA, 600 rpm—2200–480–240 V. G.E.
1—225 KVA, 900 rpm—2200–550 V. G.E.
1—187 KVA, 900 rpm—2300–550 V. Whse.
1—187 KVA, 257 rpm—220–440 V. G.E.
1—150 KVA, 900 rpm—4000–2300–550 V. G.E.
1—112½ KVA, 1200 rpm—480–240 V. G.E.
1—112½ KVA, 900 RPM—480/240 V. G.E.
1—56 KVA, 1200 rpm—2200–480–240 V. G.E.

SPECIAL OFFERING

1—300 KW 1200 RPM Whse. rotary converter 6 phase 60 cycle 275 volt DC with 13200 volt transformers.

1—300 KW rotary converter same specifications except 2300 volt transformers.

Engine Generator Sets—Steam

1—300 KW, 200 rpm, 250 V. G.E. type MPC compound wound interpole generator connected to 23"x25" 125/150 lb. Harrisburg Uniflow Engine.
1—100 KW, 257 Rpm 60 cyc. 240 V. connected to Ames 15"x14" slide valve engine.
1—90 KVA 300 RPM., 3 ph. 60 cy. 240 V. G.E. alternator dir. conn. to Skinner 12x12" slide valve engine.
1—25 KW GE unused 560 Rpm 115 V DC connected to 43 HP 560 RPM 4 cylinder gasoline engine.

Motor Generator Sets

1—200 KW, 250 volt, 1200 RPM Ridgway, connected to 300 HP, 2300 volt, 60 cycle synchronous motor.
1—150 KW, 250 V. 1200 rpm., G.E. type MPC compound wound interpole conn. to G.E. type ATI, 225 HP 2300/4000 V. 60 cy. 3 ph. syn. motor.
1—150 KW 125 V., 1200 RPM G.E. type MPC, connected to 225 HP 2300/440 V., 60 cycle Syn. motor.
1—100 KW, 125 V. 1200 rpm., Elec. Mchy. connected to 125 KVA 2300/4000 V. 60 cy. syn. motor.
1—75 KW, 125 V. 1200 rpm., G.E. type RC comm. to type ATI, 115 HP, 220/440/550 V. 60 cy. syn. motor.
1—50 KW, 125 V. 1200 rpm. G.E. type CD compound wound connected to G.E. type KT 75 HP, 220/440 V. 3 ph. 60 cy. motor.
1—50 KW, 250 V. 1200 rpm. Whse. type SK compound wound connected to CS 75 HP, 440/550 volt 3 ph. 60 cyc. motor.
1—35 KW, 125 V. 1200 rpm. G.E. type RC compound wound connected to KT, 50 HP, 220/440 volt 3 ph. 60 cyc. motor.

Turbo Generator Sets

1—300 KW, 125 V. D.C. G.E. generator geared to G.E. 4500 rpm. condensing or non condensing turbine.
1—300 KW, 3 ph., 60 cy., 240/480 V. Allis Chalmers alternator conn. to non-condensing turbine.
1—75 KW, 250 V. D.C. type CCD Crocker-Wheeler gen. direct connected by coupling to Moore 1800 rpm. non-condensing turbine.

Diesel Engines

1—75 HP Worthington 450 RPM 4 cylinder 2 cycle engine.

OUR GUARANTEE IS YOUR SAFEGUARD

D.C. Generators

KW	Volts	Make	Type	Speed
125	250	G.E.	RC	675
75	125	G.E.	RC	1150
50	125	G.E.	CD	1150
45	125	G.E.	LC	750

Transformers—60 Cy.

3—1500 KVA, G.E., H-DH, 23000–2300/4000 Y.
3—1250 KVA, GE., H-VDD, 6600–550.
3— 667 KVA, Whse., 22000–2400.
3— 500 KVA, Moloney, type C, 13200–460 V.
3—400 KVA, Whse., 2400–240/480.
3— 333 KVA, G.E., H-L, 2400–480/240/120.
3— 250 KVA, G.E., H-KD, 23000–2300.
3— 200 KVA, G.E., H-KS, 2300–230/115.
3— 150 KVA, G.E., H, 13200–230/460.
2— 150 KVA, G.E., H-LQT, 2400–240.
3— 150 KVA, G.E., type H-KF 2300–230/460.
1— 150 KVA, G.E., HTQ, auto 220 volt 3 ph 220 volt 2 ph 3 wire.
3— 100 KVA, Pittsburgh 2300–115/230 V.
3— 100 KVA, G.E., H-KR, 6600/13200–2300.
3— 100 KVA, Whse., 13200–125/250.
3— 100 KVA, G.E., H-KS, 2300–115/230.
2— 75 KVA, Packard, type A, 2300–460.
3—37½ KVA, G.E., H-K, 2200–460.
2—37½ KVA, Wagner, HE 220–220/110.
3— 25 KVA, G.E., H-K, 2300–115/230.
3— 25 KVA, G.E., H-K, 2300/4000 Y–230/460.
3— 25 KVA, G.E., type H-K, 460–115/230.
2— 25 KVA, Whse, type S, 4800/4150/3600/2400–120/240 V.
3— 20 KVA, Moloney, type RE, 2200–110/220.

Air Compressors

2—16x10" Penn. 45 lb. 600 cu.ft. short belt drive.
1—17x10x12" Worthington 405 cu.ft. 100 lb. short belt drive.

INSTRUMENT TRANSFORMERS;
COMPENSATORS;
METERS;
DRUM CONTROLLERS;
AIR CIRCUIT BREAKERS;
GRIDS BUILT FOR YOUR APPLICATION;
SWITCHBOARDS BUILT TO SPECIFICATIONS.

STEPHEN HALL & COMPANY, Inc.

430 SEVENTH STREET •• HOBOKEN, N.J.

OUR REPUTATION

is your guidepost to greater values. Buy with confidence . . . the finest rebuilt equipment that money can buy! Modernize your plant . . . add to its capacity with Hemphill Service-Plus rebuilt and reconditioned equipment.

All listed items ready for immediate shipment.

MOTORS • GENERATORS MOTOR GENERATOR SETS TURBINES • TRANSFORMERS

SPECIALS

(3) 40 KW, 60/120 cycle, General Electric, type ITT, Frequency Changers.

(1) 75 KW, Ames Uniflow with Westinghouse 250 volt, SK Generator.

MOTOR GENERATOR SETS

1—500-kw., 600-V., General Electric, synchronous.
2—500-kw., 250-V., General Electric, synchronous.
1—200-kw., 125-V., G.E. Synchronous.
1—150-kw., 250-V., Westinghouse Synchronous.
2—100-kw., 125-V., G.E., Sq. Cage.
1—100-kw., 125-V., G.E. Synchronous.
1—100-kw., 250-V., Westinghouse Synchronous.
1— 75-kw., 125-V., Crocker-Wheeler Synchronous.
1— 75-kw., 250-V., G.E., Synchronous.
1— 50-kw., 125-V., G.E. Sq. Cage.
1— 50-kw., 250-V., G.E. Sq. Cage.
1— 40-kw., 125-V., Westinghouse synchronous.

TURBINES

1—500-kw., General Electric, 3 phase, 60 cycle, 480 volt bleeder.
1—400-kw., General Electric, non-condensing
1—156-kva.,Westinghouse, non-condensing.
2—100-kw., Westinghouse, 220 volt, 3 phase, 60 cycle non-condensing.
1—62½ kva., Allis Chalmers-Kerr, 3 phase, 60 cycle, 220 volt.

TRANSFORMERS

3—500-kva., G.E. 13,200/2400 volts.
9—400-kva., Wagner, 2400-240/480 volt.
1—400-kva., G.E., 2400/240-480 volts.
3—333-kva., G.E. 11000/2300 volts.
4—300-kva., Pittsburgh, 4600/115/230 volts.
4—250-kva., Moloney, 7800-220/440 volts.
3—200-kva., G.E. 13,800/460 volts.
4—200-kva. Pittsburgh, 7800/220/110 volts.
3—150-kva., General Electric, 33000/2300 volts.
6—150-kva., General Electric, 2200-220/440 volts.
2—150-kva., Westinghouse, 2300/230/115-V.
3—150-kva., Pittsburgh, 6600/400 volts.
2—100-kva., General Electric, 2200-220/440 volts.
6—100-kva., Wagner, 2400-120/240 volt.
2— 50-kva., Kuhlman, 2200-110/220/440 volts.
5— 25-kva., Westinghouse Air Cooled, 440/220/220/110 V.
3— 25-kva., General Electric, 2300-230/460 volts.
1— 25-kva., G.E., 440/110-V.
1— 25-kva., G.E., 220/220/110-V.
4— 21-kva., G.E., 440/110-V.
3— 15-kva., G.E., 440/120-V.
4— 15-kva., Westinghouse Air Cooled, 220/440/220/110-V.

D.C. GENERATORS

100 KW, 600 RPM, 125/250 V., G.E.
100 KW, 900 RPM, 250 V., Westghse.
75 KW, 1200 RPM, 125 V., Crock. Wheel.
50 KW, 1200 RPM, 250 V., G.E.
50 KW, 1200 RPM, 125 V., G.E.
32 KW, 650 RPM, 125 V., Westghse.
50 KW, 900 RPM, 550 V., G.E.

D.C. MOTORS

230 VOLTS

225 HP, Crock. Wheel., 520 RPM.
215 HP, G.E. 755 RPM.
100 HP, G.E., 900 RPM.
100 HP, Westghse, 625 RPM.
80 HP, G.E., (series) 490 RPM.
60 HP, G.E., 1050 RPM.
50 HP, Westghse, 1750 RPM.
50 HP, Crock. Wheel., 1100 RPM.
40 HP, G.E., 1100 RPM.
40 HP, G.E., 300 RPM.
30 HP, Westghse, 725 RPM.

SLIP RING MOTORS

3 PHASE, 60 CYCLE

500 HP, 450 RPM, G.E., 2200/4150 V.
400 HP, 514 RPM, Westghse, 440 V.
350 HP, 450 RPM, G.E., 440 V.
350 HP, 300 RPM, G.E., 440 V.
300 HP, 720 RPM, G.E., 440 V.
300 HP, 600 RPM, Lincoln Elec., 440 V.
300 HP, 600 RPM, G.E. 2200 V.
200 HP, 450 RPM, G.E., 2200/4150 V.
150 HP, 600 RPM, G.E., 2200 V.
100 HP, 1200 RPM, G.E., 440 V.
100 HP, 900 RPM, G.E., 220/440 V., MTC.
100 HP, 720 RPM, G.E., 220 V.
75 HP, 1200 RPM, G.E., 220 V.
75 HP, 900 RPM, G.E., 440 V.
75 HP, 720 RPM, Westghse, 440 V.
75 HP, 720 RPM, G.E., 2200 V.
60 HP, 900 RPM, Howell, 220 V.
60 HP, 720 RPM, G.E., 2200 V.
60 HP, 600 RPM G.E., MTC, 220 V.
50 HP, 900 RPM, G.E., 440 V.
50 HP, 720 RPM, Westghse, 220 V.
50 HP, 450 RPM, G.E., 220 V.
40 HP, 1800 RPM, G.E., 220 V.
40 HP, 1200 RPM, Wagner Elec., 440 V.
40 HP, 1200 RPM, G.E., 2200 V.
40 HP, 900 RPM, G.E., 2200 V.
40 HP, 600 RPM, G.E., 220 V.

A.C. GENERATORS

3 PHASE, 60 CYCLE

720 KVA, 360 RPM, G.E., 220/440 V.
625 KVA, 450 RPM, Westghse 600 V.
625 KVA, 3600 RPM, G.E., 600 V.
400 KVA, 400 RPM, Westghse, 240 V.
375 KVA, 240 RPM, Westghse, 2300 V.
375 KVA, 200 RPM, Elec. Mach., 240 V.
250 KVA, 3600 RPM, Allis Chal., 600 V.
200 KVA, 720 RPM, G.E., 600 V.
225 KVA, 900 RPM, G.E., 240 V.
150 KVA, 450 RPM, Westghse, 240 V.
100 KVA, 900 RPM, Westghse, 2300 V.
50 KVA, 300 RPM, G.E., 2300 V.
41 KVA, 1200 RPM, Ideal Elec., 220 V.
25 KVA, 1200 RPM, Westghse, 220 V.
15 KVA, 1800 RPM, G.E., 120 V.

VARIABLE SPEED

230 VOLT MOTORS

H.P.	R.P.M.	Type
1—150	300/ 900	Westinghouse
100	475/1200	Electro. Dyn.
90	470/ 940	G.E.
75	235/ 950	Burke
60	600/1200	G.E.
35	500/1500	G.E.
35	500/1250	G.E.
30	600/1200	Westinghouse
30	225/ 900	Cr. Wheeler
25	300/1200	G.E.
25	650/2200	Westinghouse
20	750/1500	G.E.
4— 20	300/1200	G.E.
3— 15	300/1200	G.E.

SYNCHRONOUS MOTORS

3 PHASE, 60 CYCLE

720 HP, 514 RPM, G.E., 13,200/6600 V.
720 HP, 360 RPM, G.E., 440 V.
350 HP, 100 RPM, G.E., 220/440 V.
300 HP, 720 RPM, G.E., 2200 V.
300 HP, 450 RPM, E.M., 440 V.
250 HP, 450 RPM, E.M., 440 V.
200 HP, 400 RPM, G.E., 440 V.
225 HP, 900 RPM, G.E., 4150 V.
200 HP, 514 RPM, G.E., 4150/440/220 V.
150 HP, 1200 RPM, Ideal Elec., 4150 V.
100 HP, 900 RPM, Westghse, 2200 V.
100 HP, 720 RPM, G.E., 2200 V.
75 HP, 1200 RPM, Ideal Elec., 440/220 V.
75 HP, 900 RPM, E.M., 4150 V.
55 HP, 1200 RPM, G.E., 440/220 V.

SQUIRREL CAGE MOTORS

3 PHASE, 60 CYCLE

450 HP, 900 RPM, Ridgwy, 2200 V.
250 HP, 360 RPM, Westghse, 440 V.
200 HP, 600 RPM, G.E., 440 V.
150 HP, 1800 RPM, G.E., 2200 V.
150 HP, 1200 RPM, G.E., 440 V.
115 HP, 1200 RPM, G.E., 550 V.
100 HP, 1800 RPM, Allis Chal. 440 V.
100 HP, 1200 RPM, G.E., 220 V.
90 HP, 400 RPM, Crock. Wheel., 550 V.
75 HP, 1800 RPM, G.E., 2200 V.
75 HP, 900 RPM, G.E., 2200 V.
75 HP, 900 RPM, G.E. (enclosed) 440 V.
75 HP, 720 RPM, G.E., 220 V.
75 HP, 514 RPM, G.E., 220 V.
60 HP, 1200 RPM, G.E., 440 V.
50 HP, 1200 RPM, Ideal Elec., 550 V.
50 HP, 900 RPM, G.E., 2200 V.
50 HP, 900 RPM, G.E., 220 V
50 HP, 720 RPM, G.E., 220 V.
50 HP, 600 RPM, Westghse, 440 V.

J. L. HEMPHILL & CO., Inc.

801 Williams St. NO. BERGEN, N. J. Ph. Palisades 6-2600

CHICAGO
Howard B. Johnson, 53 W. Jackson Blvd.

TELETYPE DESIGNATION
Union City, N. J., 1750

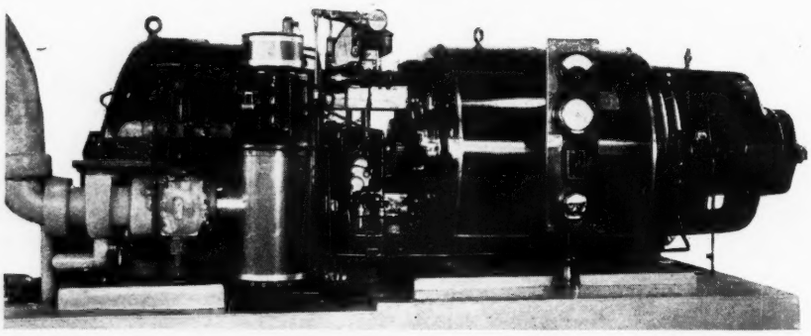
NEW YORK PHONE
Longacre 5-3227

Turbo-Generators

DEPENDABLE TURBINES

Some of them practically new—

A PARTIAL LIST ONLY



1563 KVA, General Electric 3/60/2300-volts, 200# P, 500°F-TT, Surface Condenser

1—G.E. 7500 KVA, 3/60/2300-v, 250#-175° TT Surface Condenser.

1—ALLIS-CHALMERS 4000 KVA, 3/60/2300-v, 200# P. 450°F-TT, Surface Condenser.

1—WEST. 3750 KVA, 3/60/2300-v, 200#, 500°TT Condensing.

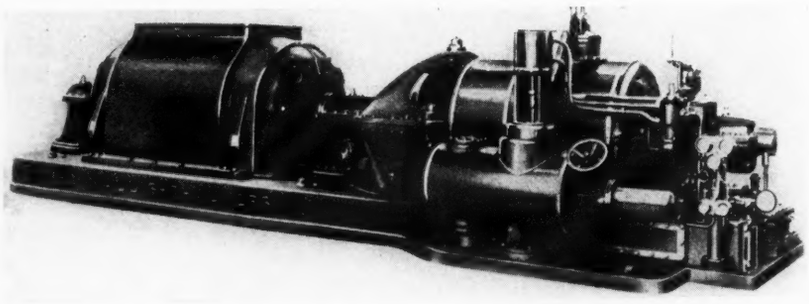
1—GENERAL ELECTRIC 2500 KVA, 3/60/2300-v, 200# P. 100°F SH, Surface Condenser.

1—G.E., 1875 KVA, 3/60/2300-v, 200#-450°, Condensing.

1—G.E. 1563 KVA, 200#, 500°TT, 3/60/-2300-v, Condensing.

1—ALLIS-CHALMERS 1563 KVA, 3/60/480-v, 200#-450°F.TT, Condensing.

1—GENERAL ELECTRIC 1563 KVA, 3/60/2300-v, Condensing.



ALLIS-CHALMERS 3125 KVA, Condensing, 3/60/480/2300/6600-v, 200# P
Used 4 Months Only

1—ALLIS-CHALMERS, 1250 KVA, Condensing: 3/60/480-v: 200# G, 475° TT.

1—G.E. 1250 KVA, 3/60/2300-v, 175#, 10# Back Pressure, Non-condensing.

1—ALLIS-CHALMERS, 1250 KVA, 3/60/2300-v, 210#, 100°F.TT, Surface Condenser.

1—WESTINGHOUSE 937 KVA, 3/60/480/2300-v, 250# 600°TT, Condensing.

1—ALLIS-CHALMERS 780 KVA, 3/60/2300-v, 200# P. 450°F-TT, Surface Condenser.

1—G.E. 750 KVA, 3/60/480-v, 250#, 550°TT, 30# G. Extraction.

1—WESTINGHOUSE 625 KVA, 3/60/480-v, 200# P. 5 to 20#, non-condensing back pressure.

1—MOORE-ALLIS 375 KVA 480/2300-v, Non-condensing, 250#, 600°, 5-25# Back Pressure.

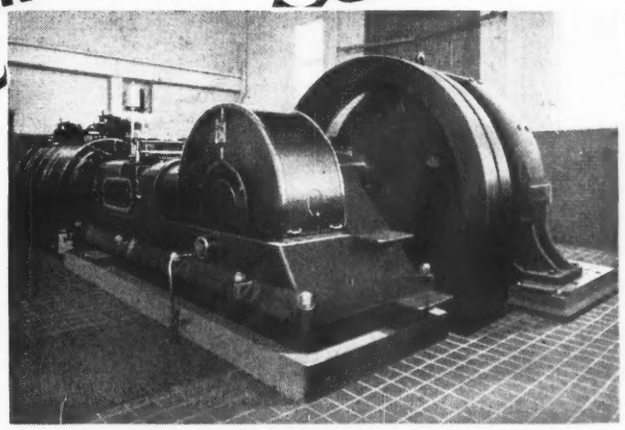
WILMS, WEAVER & CO. Union Guardian Bldg. DETROIT, MICH.

We Deal in Turbo-Generators Exclusively

POWER EQUIPMENT VALUES

Prices will advance

Save money, NOW! on the PICK OF POWER EQUIPMENT!



500 KW 250 V. Skinner Uniflow Engine Unit.

A. C. TURBO UNITS—60 Cy.

1—50000 KVA General Electric Cond.
1—18750 KVA General Electric Cond.
1—12500 KVA Westinghouse Cond.
1— 7500 KVA General Electric Cond.
1— 6250 KVA Westinghouse Cond.
1— 5000 KVA General Electric Cond.
1— 4375 KVA Westinghouse Cond.
1— 4000 KVA Allis-Chalmers Cond.
1— 3750 KVA Westinghouse Cond.
2— 3125 KVA Allis-Chalmers Cond.
1— 3125 KVA General Electric Extr.
1— 3125 KVA General Electric Cond.
1— 2500 KVA General Electric Cond.
1— 1875 KVA General Electric Extra.
1— 1563 KVA General Electric Cond.
1— 1250 KVA General Electric Cond.
1— 1250 KVA General Electric Extr.
1— 375 KVA General Electric Cond.

1— 6250 KVA Allis-Chalmers Non-C.
1— 1875 KVA Westinghouse Non-C.
1— 1666 KVA General Electric Non-C.
1— 1250 KVA Allis-Chalmers Non-C.
1— 944 KVA Westinghouse Non-C.
1— 625 KVA General Electric Non-C.
1— 373 KVA Westinghouse Non-C.
1— 373 KVA General Electric Non-C.
1— 125 KVA Westinghouse Non-C.

D. C. TURBO UNITS

1—2000 KW Westinghouse 250 V. 3 wire
1—1000 KW Crocker Wheeler 250 V.
1— 300 KW General Electric 250 V.
1— 300 KW General Electric 125 V.
1— 200 KW General Electric 125 V.
1— 200 KW General Electric 250 V.
1— 100 KW General Electric 125 V.

A. C. STEAM ENGINE UNITS

1—900 KVA 60 cy. Hamilton Corliss
1—770 KVA 60 cy. Skinner Uniflow
2—937 KVA 60 cy. Nordberg Uniflow
1—450 KVA 60 cy. Skinner Uniflow
2—375 KVA 60 cy. Skinner Uniflow
2—312 KVA 60 cy. Skinner Uniflow
1—312 KVA 60 cy. Ames Uniflow
1—312 KVA 60 cy. Chuse Uniflow
1—312 KVA 60 cy. Ideal 4-valve
1—250 KVA 60 cy. Skinner Uniflow

D. C. STEAM ENGINE UNITS

1—750 KW Nordberg Uniflow 250 V.
1—500 KW Nordberg Uniflow 250 V.
1—500 KW Nordberg Uniflow 125 V.
1—500 KW Skinner Uniflow 250 V.
1—400 KW Ridgway Uniflow 250 V. 3 wire
1—400 KW Mesta Uniflow 250 V.
1—400 KW Chuse 125/250 V. 4 valve
1—300 KW Skinner Uniflow 250 V.
1—300 KW Harrisburg Uniflow 250 V.
1—300 KW Ridgway 250 V. 4 valve
2—200 KW Skinner Uniflow 250 V.

A. C. OIL ENGINE UNITS—60 Cy.

1—1000 KVA G.E.-Pacific 480 V.
2— 400 KVA Nordberg 240 V.
1— 375 KVA Worthington 2300/440/220 V.
2— 375 KVA McIntosh & Sey. 440/220 V.
1— 343 KVA Ing.-Rand 2300/440/220 V.
3— 300 KVA Fair-Morse 2400/460/230 V.
1— 250 KVA Worthington 2300/440/220 V.
3— 219 KVA General Electric 2300/440/220 V.
1— 87½ KVA Worthington 2300/460/230 V.
1— 60 KVA Fair-Morse 2300/460/230 V.

WATER TUBE BOILERS—A.S.M.E.

3—814 HP. Casey-Hedges 200-lb. stokers
3—752 HP. Stirling 200-lb. stokers
1—725 HP. Stirling 200-lb. stokers
2—550 HP. Connelly 200-lb. stokers
2—520 HP. Heine 200-lb.
2—484 HP. Springfield 225-lb. stokers
1—460 HP. Wickes 160-lb. NEW
2—404 HP. Springfield 200-lb. stokers
1—400 HP. Connelly 200-lb. stoker
1—380 HP. Heine 200-lb.
1—300 HP. B. & W. 200-lb.
2—258 HP. Union 178-lb.
1—250 HP. Erie City 160-lb.
2—150 HP. B. & W. 160-lb.
1—100 HP. Erie City Economic 125-lb.

MOTOR-GENERATORS—60 Cy.

2—1500 KW General Electric 600 V.
1—1500 KW General Electric 275 V.
1—1000 KW Allis-Chalmers 600 V.
1— 750 KW Westinghouse 650 V.
1— 720 KW Westinghouse 125 V.
1— 500 KW General Electric 700 V.
1— 300 KW Allis-Chalmers 250 V. 3 wire

AIR COMPRESSORS

1—3400 ft. 110-lb. Ing.-PRE 60 cy motor
2—1574 ft. 100-lb. Sul. WN 60 cy motor
1—1302 ft. 100-lb. Ing. PRE 60 cy motor
1—1051 ft. 100-lb. Sul. WN 60 cy motor
1—1260 ft. 100-lb. Ing. XPV, steam

TRANSFORMERS—1 Ph. 60 Cy.

3—1667 KVA G.E. 66000/22000 volts.
4—1000 KVA West. 66000/13200 volts.
3— 667 KVA Pitts. 66000/2200 V.
3— 500 KVA G.E. 66000/2300 V.
1—10000 KVA G.E. 45000/13200, 3 ph.
2—5000 KVA G.E. 45000/13200, 3 ph.
3—1666 KVA G.E. 46000/11000-2300 V.
3—1250 KVA G.E. 46000/2300 V.
3— 333 KVA Pitts. 44000/2300 V.
3—1000 KVA West. 33000/13200-6600-2300 V.
4—1000 KVA G.E. 33000/22000 V.
3— 850 KVA G.E. 33000/2300 V.
3— 500 KVA Allis 33000/480 V.
3—1500 KVA G.E. 23000/2300 V.
3— 500 KVA Packard 22000/11000-240/440 V.
3— 250 KVA G.E. 23000/2300 V.
3— 667 KVA Allis 13200/2400 V.
3— 500 KVA Packard 13200/2300 V.
3— 500 KVA Moloney 13200/6600-460 V.
3— 333 KVA Pitts. 13200/2400 V.
3— 333 KVA West. 13800/110-220-440 V.
3— 200 KVA G.E. 13200/2300 V.
3— 150 KVA G.E. 13200/230-460 V.
3—1000 KVA West. 11400/2300 V.
3— 750 KVA West. 11000/2300-4600 V.
3— 667 KVA G.E. 11500/460 V.
3— 100 KVA West. 11000/250-125 V.
3—1250 KVA G.E. 6600/550 V.
3— 500 KVA West. 6600-220/230-460 V.
3— 150 KVA Moloney 6600/220-440 V.
3— 500 KVA Moloney 2300/460-230 V.
3— 300 KVA Packard 2200/440 V.
3— 100 KVA G.E. 2300/115-230 V.

ROTARY CONVERTERS—60 Cy.

1—1250 KW General Electric, 240 V.
1— 300 KW Allis-Chalmers, 275 V.

FREQUENCY CHANGERS

1—10000 KW West. 60/25 cy. 300 RPM.
1— 5000 KVA West. 25/62½ cy. 750 RPM.
2— 3000 KW West. 60/25 cy. 300 RPM.
1— 1800 KW G.E. 25/60 cy. 300 RPM.
1— 1000 KW G.E. 25/60 cy. 300 RPM.
1— 750 KVA. West. 60/25 cy. 300 RPM.
1— 300 KW West. 25/62½ cy. 750 RPM.

THE ABOVE IS ONLY A PARTIAL LIST

TURBINES	DIESELS	TRANSFORMERS
ENGINES	GENERATORS	ROTARIES
BOILERS	MOTORS	COMPRESSORS
PUMPS	MOTOR GENERATORS	CONDENSERS, ETC.

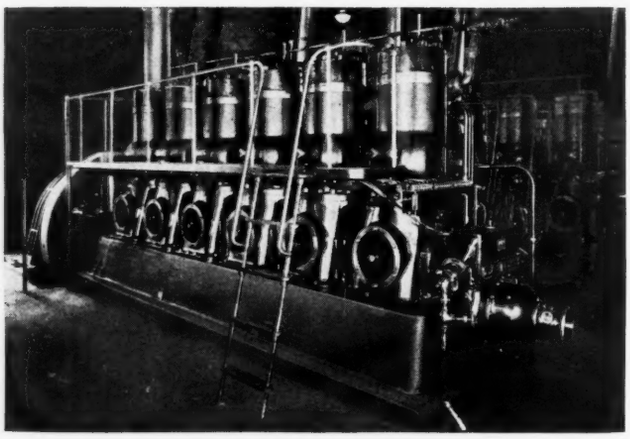
35 *Years of National Service*

BREW, WOLTMAN & CO., INC.

52 CHURCH ST. NEW YORK CITY

ONLY 4 Diesels left!

360 HP-300 KVA



FAIRBANKS-MORSE

Model 32 full Diesel Engines

EACH COMPLETE WITH GENERATOR AND SWITCHBOARD CONTROL

6 cylinder, 2 cycle, solid injection, 14 x 17, 257 r.p.m., direct connected to Fairbanks-Morse Alternator, 300 KVA, 3 phase, 60 cycle, 2400 volts, with direct connected Fairbanks-Morse Exciter. Generator and Exciter control switchboard with each engine. Serial Nos. over 700,000. Units only seven and nine years old. Thoroughly modernized.

- 1—Gasoline Engine driven Fairbanks-Morse auxiliary Air Compresor starting unit.
- 1—Fairbanks-Morse electric motor driven Air Compressor starting unit.
- 9—Air storage tanks for starting service.
- 4—3" Fairbanks-Morse ball-bearing motor driven Centrifugal pumps with 7½ H.P. Fairbanks-Morse Motor, 220/440 volt, 3 phase, 60 cycles.

THREE UNIFLOW ENGINE GENERATOR SETS

One—312 KW Engine Generator Set:

Chuse Engine, Uniflow 20"x24", 150# pressure.

Generator, Electric Machinery Co., 312 KW, 3 phase, 60 cycle, 2300 V, 75 amps. 200 RPM.

Exciter: Motor, GE. 20 HP, 1800 RPM, 48 amp. 220 V, 3 phase, 60 cycle, type KT-501S.
Generator, GE, 12 KW, type CD-75, 125 V, DC., 96 Amp. 1800 RPM, compound wound.

One—250 KW Engine Generator Set:

Skinner Engine, Uniflow, 21"x24", 150# pressure.

Generator, GE, 250 KW, type TRE, form D, .8 PF, 3 phase, 60 cycle, 2300 V., 200 RPM.

Exciter: Motor, GE, 25 HP, 1800 RPM, 440/220 V, 31/62 amp., 60 cycle, 3 ph. Generator, GE, 15 KW, type RC29, form A4, 125 V, D.C., 1800 RPM.

One—72 KW Engine Generator Set:

Skinner Engine, uniflow, 13"x15", 150# pressure.

Generator, GE, 72 KW, 277 RPM, 3 phase, 60 cycle, 2300 volts.

Belted Exciter: GE, 7 KW, type ML, form I, 56 amp. 125 V. DC.

All above engine generator sets complete with switchboard

Turbine One—**Exciter:** Terry Turbine, 150# pressure, direct connected to: 1—Generator, G.E., 15 KW, 120 amp, 125 V. D.C. type RC form A-2. Complete with electrical equipment.

Engine One—American Blower Co. Vertical Steam Engine single cylinder, 7"x7" type.

Ice Machines Two—Wittenmeier Machinery Co. 20 ton each ice machines, Carbonic and Anhydride CO_2 system, belt driven by Wagner Electric Motors, 35 HP, 220 V. A.C., 3 phase, 60 cy. 860 RPM, 90 Amp., with motor starters. These machines are equipped with coils, brine tanks and misc. piping and fittings.

The above Uniflow Engines may be inspected at Aldon Park Manor, 8100 Jefferson Ave, Detroit, Michigan.

Liquidators and appraisers—Complete Plants and Single Units Bought for Cash.

INDUSTRIAL EQUIPMENT CO., INC.

Suite 1419-20, 71 W. 23rd St. New York City. Ph: St. 9-1266

4 STAR ERIE 4 STAR GUARANTEED EQUIPMENT

Guaranteed Rebuilding — Unmatched Savings

"IT SAVES YOU RIGHT"

MOTOR GENERATOR SETS

WESTINGHOUSE VARIABLE VOLTAGE M. G. SETS SUITABLE FOR ANODIZING OR WELDING OR BATTERY CHARGING:

3—1000 Amp. Sets—Motor 60/3/2200
1—1500 Amp. Set—Motor 60/3/2200
1—3000 Amp. Set—Motor Synch. 60/3/2200

ALL DIRECT CONNECTED FACTORY SETS, LIKE NEW, WITH PANELS.

1—100 KW Westinghouse SK173 Generator 1200 RPM, 400 Amp., 250 Volt on base and driven by 150 HP Westinghouse Synchronous Motor, 4100/2300 Volts, 60 Cycle, 3 Phase, 1200 RPM, complete with Panels.

1—30 KW M. G. Set, G. E., factory built, Motor 32 HP G. E., KT, 25/3/220/750, Generator G.E. 30 KW, 600 Amp. 30 Volts; complete with panels.

1—30 KW G. E. M. G. Set: Motor 32 HP G. E. I-K; Generator G. E. 30 Volts, 600 Amp. Factory built set with panels.

1—20 KW Gen. Elec. 125 V., D.C., direct connected to 30 HP Gen. Elec. 25/3/440/1500 RPM.

SLIP RING MOTORS

60 Cycle, 3 Phase, 220/440 Volts

HP	MAKE	TYPE	FRAME	RPM
82	G. E.	ITC	5014	514
75	G. E.	MT	537	1800
60	G. E.	MT	353	1800
50	Wesgh.	CW	654C	1800
50	Wesgh.	CW	654C	1800
50	Wesgh.	CW	654C	1800
40	Wesgh.	CW	644C	1200
40	Wesgh.	CW	.....	1200
40	Wagner	22WB	.....	540
40	Wesgh.	CW	748	690
40	Wesgh.	CW	748	690
40	Wesgh.	CW	748	690
40	Wesgh.	CW	748	690
40	Wesgh.	CW	748	690
30	Wesgh.	CW	.....	1200
25	G. E.	MT	513	1800
25	G. E.	I-M-	.....	1200
25	Wesgh.	CW	.....	690
25	Wesgh.	CW	750C	575
20	G. E.	MT	503	1800
20	G. E.	MT	332	545
20	Wesgh.	CW	748A	575
20	Wesgh.	CW	748A	575
20	Wesgh.	CW	748A	575
20	Wesgh.	CW	748A	575
20	Wesgh.	CW	748A	575
20	Wesgh.	CW	748A	575
20	Wesgh.	CW	744C new	575

FREQUENCY CHANGER SETS

You now have an opportunity to purchase the following four General Electric Frequency Changer Sets. They are the finest equipment we have ever been able to offer for immediate sale:

Driving Motor—100 HP G. E. KT559, 750 RPM, 25/3/220, Serial No. 5207712, direct coupled to:
Frequency Changer—125 KW G. E., ITT565, 62½ cycles, 3 phase, 235 volts, 750 RPM, Serial No. 5207711
Driving Motor—75 HP. G. E., KT543, 25/3/220/1500, Serial No. 5207710, direct coupled to
Frequency Changer—60 KW, G. E., ITT546, 125 cycle, 3 phase, 90 amps., 470 volts, .8 P.F., Serial No. 5207709.
Driving Motor—50 HP G. E. KT547, 25/3/220/750, Serial No. 5056050, belt driven to
Frequency Changer—50 KW G. E. ITT553, 80 cycles, 3 phase, 300 volts, 1100 RPM, Serial No. 5208273.

The above sets are complete in every detail with compensators for motors and switches. They will not last long and are offered "first come, first served." We suggest you call CLeveland 4758 and arrange for immediate inspection and purchase while they last. We also have a large stock of 60 Cycle to 120 and 175 Cycle.

A BARGAIN
3—2000 HP Westinghouse Motors 600 Volts DC 300/500 RPM Comp. Wd. with Starting Eqpt. New 1928—immediate inspection & Sale

25 CYCLE MOTORS

Amt.	H.P.	Make	Type	Voltage	Speed
1	75	West.	CS	220/440	500
1	75	West.	MS	220/440	500
1	75	West.	CCL	220/440	500
2	75	G. E.	KT557	220/440	750
1	100	G. E.	KT	220/440	750
1	100	G. E.	I-K	220/440	300
1	100/200	G. E.	I-K	440	250/500
1	200	G. E.	I-K	440	750

PUMPS

50 HP Westinghouse CW Slipring 60 Cycle, 3 Phase, 220/440 Volt, 900 RPM Vertical; connected to sludge booster, 35' lift. New with automatic panels.

30 HP Westinghouse CW Slipring 60 Cycle, 3 Phase, 220/440 Volt, 900 RPM Vertical; connected to sludge booster, 35' lift. Can be inspected in pump house.

New--Exhaust Fans--New
500 Exhaust Fans 16" & 18"
25 Exhaust Fans 30"

PLATING GENERATORS

2—750/1500 amp. double commutator, 6/12 volts, ready for shipment. Bargain, don't miss this.

ROTARY CONVERTERS

1—200 KW Westinghouse, 250Volts, DC end, AC end, 25 cycle, 750 RPM, with Panels & Transformers.
2—300 KW, Westinghouse, 250 Volts, DC end, AC end, 25 cycle, 3 phase, 750 RPM, with Panels & Transformers.
1—30 KW Martin Rotary Converter, 115/230 Volts DC—AC end 25 Cycle, 3 Phase, 440 Volts, with Panels & Transformers. Factory Built unit like new.

WE WANT TO BUY
2—1500 or 2000 KW DC Generators 250 Volts driven by Synchronous Motors 60 Cy 3 phase 4600 Volts.
Also 150-200-300-500-750 KW 250 V DC MG Sets 60 Cycle drive
25 Cycle GE KT Motors 10-15-20-25-30-40-50 H.P. 1500 R.P.M.
FOR CASH

TRANSFORMER SPECIALS

Amt.	KVA	Make	Cycles	Voltage
3	3000	West.	60	13800/2300
3	1667	G. E.	25	22000/2200
3	1050	G. E.	25	12700/445
1	1050	G. E.	25	11000/22000/445/300/155
3	1000	G. E.	60	22000/2200
3	625	West.	60	13200/11500/2300
3	750	G. E.	60	13200/2300
3	500	Packard	60	2300/460
3	500	Packard	60	13200/2300
3	333	G. E.	60	4600/230/460
3	333	G. E.	25	13200/220/440
3	300	G. E.	60	4600/230/460
6	250	G. E.	60	6600/2300
3	250	G. E.	60	2300/230/460
6	200	G. E.	60	4600/230/460
3	200	West.	60	4600/230/460
2	200	Moloney	60	4600/230/460
3	150	West.	60	4600/460
3	150	G. E.	25	2300/115/230
2	100	G. E.	25	4600/115-230/460
3	100	Wagner	60	2300/4600-115/230
9	100	West.	60	4600/230/460
3	100	G. E.	60	4600/230/460
2	100	Moloney	25	2300/115/230
2	75	West.	60	4600/230/460
12	75	West.	25	12000/230/460
6	75	G. E.	60	4600/230/460
3	75	Moloney	60	4600/230/460
3	50	G. E.	60	440/220/110
7	50	G. E. & Wst.	25	11500/230/460

Write for Prices on Niagara Transformers

SQUIRREL CAGE

60 Cy., 3 Ph., 220/440 Volt

Amt.	H.P.	Make	R.P.M.	Type	Frame
7	5	American	1200	BB	Enclosed
10	5	G. E.	1200	KT	732
2	7½	G. E.	1200	KT	751
2	7½	American	900	BB	Enclosed
2	7½	West.	1200	CS	
2	10	West.	900	CS	460C
4	10	West.	1200	CS	370C
1	10	U. S.	1800	SC	BB Enclosed
1	20	G. E.	680	KT	532Y
2	20	West.	900	CS	
4	20	West.	1800	CS	461C
1	25	G. E.	900	KT	332
1	25	G. E.	575	I-K-	BB
1	25	G. E.	720	I-K-	
1	30	G. E.	450/900	I-K-	
1	30	G. E.	900	KT	336
1	30	G. E.	1200	KT	326
2	30	West.	1800	CS	
2	40	G. E.	900	KT	343
8	40	West.	1800	CS	
1	50	G. E.	900	KT	542
7	50	West.	1800	CS	
6	60	West.	1800	CS	
4	75	West.	1800	CS	
2	100	G. E.	1200	I-K	
2	150	G. E.	1800	KT	
2	150	West.	1200	CS	
1	200	G. E.	720	I-K	

Experienced Service — Prompt Shipment

ERIE ELECTRIC MOTOR REPAIR CO., INC.
124 CHURCH ST. BUFFALO, N. Y.

READY FOR DELIVERY...

Rebuilt—Guaranteed

Electrical Equipment Values All Priced For Quick Sales

● The list below represents only a cross-section of our large and complete stock. Each unit has been thoroughly checked. If the item you require is not named here, drop us a line. We will promptly supply description and low price quotations without obligation!

MOTOR GENERATOR SETS ROTARY CONVERTERS

550 KW Burke 250 V. 2300/3/60 M.G. Syn.
300 KW West. 250 V. 2200/3/60 M.G. syn.
200 KW West. 250 V. 2300/4000/3/60 Rotary
200 KW West. 250 V. 2300/3/60 M.G. Syn.
200 KW West. 550 V. 2200/3/60 M.G. syn.
150 KW West. 250 V. 2300/4000/3/60 M.G. Syn.
125 KW Cr. Wh. 250 V. 220/440/3/60 M.G.
100 KW Ridge 250 V. 2200/3/60 M.G. Syn.
75 KW West. 250 V. 2300/3/60 M.G.
50 KW Al Ch. 250 V. 220/440/3/60 M.G.
30 KW West 230 V. 220/3/60 M.G. Syn.

ENGINE GENERATOR SETS

500 kva. 8 PF, 400 kw. 240/3/60 G.E. dir. Con. 22"x30" Erie Ball 4 viv. eng. 150#
300 kw. West. 250 V. D.C. Skinner Uni.
300 kw. G.E. 3/60 Skinner Uniflow

TURBO GENERATORS

125 kva. Allis Chal. 220/440 V. A.C.

AIR-COMPRESSORS

578 CFM 10-15x12 Chicago 60# steam
534 CFM 16x14-10x14 I.R. 100# elec.
485 CFM 14x10 I.R. 60# pres. elec.
255 CFM 14x9 Bury 2 stage elec.

CRANES

7½/15 ton Maris 230 V. D.C. 35' 7" span with runways
10 ton Euclid 230 V. D.C. monorail
3 ton Shepard 230 V. D.C. monorail

TRANSFORMERS

3—333 kva. Pgh. 2300-115/230 1/60
1—100 kva. West. 6600-220/110 1/60
3— 50 kva. Allis 2300-220/110 1/60
3—37½ kva. West. 22000-2200 1/60

SLIPRING MOTORS

4—700 HP G E. 2300/3/60 393 rpm
4—500 HP G.E. 2300/3/60 450 rpm.
2—300 HP W. 2200/3/60 580 rpm.
1—200 HP West. 2200/3/60 580 rpm.
1—200 HP West. 2200/3/60 690 rpm.
1—200 HP Westg. 440/3/60 500 rpm.
1—150 HP G.E. 2200/3/60 435 rpm.
1—100 HP G.E. 220/3/60 600 rpm.
1— 75 HP Westg. 220 /3/60 850 rpm.
1— 50 HP Westg. 220/3/60 430 rpm.
2— 50 HP Al. 220/3/60 900 rpm.

SYN. MOTORS

300 KVA West. 2200/3/60/600.
125 KVA. West. 2200/3/60/900.

SQ. CAGE MOTORS

200 HP West. CS 220/3/60/580.
150 HP West. CS 440/3/60/1750.
125 HP West. CS 2200/3/60/1200
100 HP West. 220/3/60/1750.
75 HP Allis 220/3/60/850.
75 HP G.E. 220/3/60/1800.
60 HP G.E. 220/3/60/450.
50 HP G.E. 2300/3/60/900.
50/32 HP G.E. 440/3/60 800/640.
50 HP Allis Chal. 220/3/60/1200.

VARIABLE SPEED MOTORS 230 V. DC

80 HP West. SK-180 450/900 rpm.
25 HP West. SK-130 600/1200 rpm.
25 HP West. SK 650/2200.
25 HP G.E. RLC 400/1200.
20 HP West. SK-133 575/1150.
15 HP West. SK-100L 600/1200.
10 HP West. SK-80L 500/1500.

SERIES WOUND MOTORS

21—15 HP G.E. 230 V. CO 1807.

AC GENERATORS

10 KW G.E. 220 V. 1 ph. 60 cy. 1800 rpm.
125 KVA West. 2400 V. 3 ph. 60 cy. 900 rpm.
300 KVA West. 2300 V. 3 ph. 60 cy. 600 rpm.

230 V. DC MOTORS

225 HP West. 600 rpm.
200 HP G.E. 450 rpm.
180 HP West. 860 rpm.
175 HP Ridg. 500 rpm.
160 HP Ideal 350 rpm.
150 HP West. 550 rpm.
150 HP Cr. Wh. 625 rpm.
130 HP Cr. Wh. 1200 rpm.
125 HP G.E. 1750 rpm.
62½ HP G.E. 850 rpm.
50 HP Reliance 1750 rpm.
40/46 HP West. 1750 rpm.

DC GENERATORS

175 KW West. 230 V. 700 rpm.
160 KW G.E. 250 V. 775 rpm.
150 KW Ridgway 275 V. 560 rpm.
125 KW Ideal 125 V. 400 rpm.
125 KW Ideal 250 V. 400 rpm.
125 KW West. 250 V. 1200 rpm.
110 KW Cr. Wh. 250 V. 720 rpm.
75 KW West. 550 V. 900 rpm.
50 KW West. 125 V. 290 rpm.
40 KW West. 250 V. 1800 rpm.

PUMPS

1000 GPM Weinman 6x6 140' hd.
1000 GPM American 6x6 140' hd.
750 GPM Hayton 400' hd. size 4.
750 GPM Manistee 185' hd. size 6.
450 GPM Worthington 5x5 197' hd.
320 GPM Harris 4x3 40' hd.
200 GPM Manistee 4x4 332' hd.

DUQUESNE ELECTRIC & MFG. CO.

PITTSBURGH, PENNA.

BOILERS

1—150 HP Union Iron Works water tube, 150 lbs. pressure, Westg. stoker.
1—250 HP Kroeschell, 165 lbs. pressure, chain grate stoker.
2—150 HP HRT Boilers, 150 lbs. pressure.
3—250 HP Keeler, 160 lbs. pressure, hand fired.
3—350 HP O'Brien Heine water tube, 150 lbs. pres.
2—295 HP Stirling, 200 lbs. pressure, with Type E underfeed stokers.
1—300 HP Vogt Stirling type, 200 lbs. pressure.
2—300 HP Page cross type, 160 lbs. pressure, equivalent to new.
1—310 HP Heine, 200 lbs. pressure, Westg. stoker.
1—323 HP Springfield water tube, 250 lbs. pressure.
2—350 HP Stirling, 200 lbs. pressure, oil burners.
1—389 HP Union Iron Works, 178 lbs. pressure, Detroit stoker.
1—460 HP Wickes, brand new, 160 lbs. pressure.
3—516 HP Stirling, 200 lbs., with chain grate stokers, complete plant.
6—600 HP B&W, 200 lbs. pressure, complete plant.
2—600 HP Heine, 250 lbs. pressure, complete.
1—600 HP B&W straight tube, 200 lbs. pressure.
3—750 HP Stirling, 200 lbs. pressure, with stokers.
6—752 HP Stirling, 180 lbs., pressure, stokers.
2—755 HP B&W, 200 lbs. pressure, oil burners.
1—850 HP B&W boiler, 240 lbs. pressure, with superheaters, oil and gas fired.
2—862 HP Casey Hedges straight tube, chain grate stokers.
1—1035 HP B&W, 250 lbs. pressure, Taylor stoker, economizer.

SLIDE VALVE EN. GEN. SETS.

1—175 KW, 3-60-240 volt Ames slide valve engine.
2—125 KVA Skinner (counterflow) eng. gen. sets.

GENERATOR SETS

TURBO-GENERATOR SETS.

1—190 KW Terry, 3-60-480 volt, non-condensing turbine.
1—250 KVA Terry non-condensing turbine.
1—375 KVA General Electric condensing turbine.
1—500 KW Westinghouse non-condensing turbine.
1—500 KW Allis-Chalmers 3-60-2300 volt non-condensing turbine.
1—625 KVA General Electric condensing turbine.
2—625 KVA Allis-Chalmers condensing turbines.
1—937½ KVA General Electric condensing turbine, surface condenser.
1—937½ KVA Allis-Chalmers turbine, surface condenser.
1—1000 KW 3-wire Westg. DC condensing turbine, surface condenser.
2—1250 KW G.E. extraction turbines, complete, surface condensers, all auxiliaries.
2—1250 KVA G.E. condensing turbines, surface condenser.
1—2000 KW Westg. condensing turbine, complete, jet condenser.
1—2500 KW G.E. automatic extraction turbine, without generator.
1—2500 KVA G.E. condensing turbine, all auxil.
2—3150 KVA Ridgeway condensing turbines.
1—3750 KVA Westg. turbine, jet condenser.
2—6250 KVA G.E. condensing turbine, jet conden.
1—9150 KVA G.E. condensing turbine, surface condenser.

CORLISS ENGINE GEN. SETS

1—125 KVA Ide 4-valve Corliss engine.
1—187½ KVA Erie Ball Corliss engine generator set.
1—250 KVA Ridgeway 4-valve Corliss engine generator set.
1—280 KW 3-60-480 volt Ball non-releasing Corliss engine, rebuilt.
1—375 KVA Ball Corliss engine generator set.
1—400 KVA Cooper Corliss engine generator.
1—500 KVA Ball Corliss engine generator set.
1—500 KVA Ridgeway 4-valve Corliss engine generator set.

UNIFLOW ENGINE GEN. SETS.

1—180 KVA Ames uniflow engine generator set.
1—200 KW, 125 volt, D.C. Skinner uniflow eng. gen. set.
1—200 KW 250 volt DC Ames uniflow engine generator set.
2—312 KVA Skinner uniflow eng. gen. sets, complt.
1—250 KVA Skinner uniflow engine generator set.
1—312 KVA Nordberg uniflow eng. gen. set.
1—312 KVA Ames uniflow eng. gen. set.
1—450 KVA G.E. Skinner uniflow eng. gen. set.
1—475 KVA Skinner uniflow engine generator set.
1—500 KW, 250 volt DC Skinner uniflow engine generator set.
1—750 KW Nordberg uniflow DC eng. gen. set.

OIL ENGINES.

2—125 KVA Fairbanks Morse, type Y, style V engine generaor sets.
1—187½ KVA Busch Sulzer full diesel eng. gen .set.
1—175 KVA Worthington full diesel engine generator set.
1—200 KVA Fairbanks Morse, Model 32-B-2, full diesel set.
1—210 KVA Anderson oil engine set.
2—215 KVA Buckeye oil engine generator sets.
1—250 KVA Worthington full diesel eng. gen. set.
9—300 KVA Fairbanks Morse full diesel eng. gen. sets.
2—375 KVA McIntosh Seymour full diesel engine gen. sets.
1—450 HP Cooper Bessemer full diesel engine.

MISCELLANEOUS

FEED WATER HEATER
1—3000 HP Hoppes open type feedwater heater.

MOTOR GENERATOR SETS
1—150 KW Westinghouse synchronous motor generator set.

TURBINES
1—350 HP Kerr non-condensing turbine, 3600 RPM.

The above is only a partial list. Send us your inquiries.
LIST YOUR EQUIPMENT WITH US.

SEE *Fletcher* FIRST!

FLETCHER SALES CO.

835 Security Trust Bldg. INDIANAPOLIS, IND.

L. J. LAND AND COMPANY

Est. 1910 — 1 Year Guarantee

A.C. SQUIRREL CAGE MOTORS

H.P.	Make	Type	RPM
400	G.E.	KT565	1200
220	Cr. Wh.		1720
200	A.C.		1750
200	A.C.		1160
100	Al. Ch.	AR226C	1200
100	Westing.	CCL	720
75	Gen. Elec.	KT-337	1800
75	Westing.	CS	1170
75	Gen. Elec.	IK	720
75	Al. Ch.	AN	600
60	Gen. Elec.	KT346	1200
60	West.	CS	1200
60	Gen. Elec.	KT346	900
50	Westing.	CS	1800
50	Gen. Elec.	KT-343	1160
50	Westing.	CS	1200
50	Westing.	CS	900
50	Gen. Elec.	KT-542	900
50	Al. Ch.	AN	900
50	Gen. Elec.	KT-346	720
50	Gen. Elec.	IK	490
40	Westing.	CS	1800
40	Diehl		1800
40	Al. Ch.	AR	720
30	Westing.	CS	720

A.C. SYNCHRONOUS MOTORS

300	Westing.	600
250	G.E.	1200
55	G.E.	1200
55	G.E.	900

A.C. SLIPRING MOTORS

250	A.C.	514
150	F.M.	600
152	Gen. Elec. IM	720
112	Gen. Elec. ITC	720
100	Fr. Mrse. BA	720
100	Al. Ch.	720

A.C. SLIPRING MOTORS—Cont.

H.P.	Make	Type	RPM
100	Fr. Morse.	BV	600
75	Gen. Elec.	MT-343	1200
75	Gen. Elec.	MT-347	1200
75	Westing.	CW	1200
75	Gen. Elec.	MT552	900
75	Westing.	CW	720
62	Westing.	CW	1150
60	Gen. Elec.	MT-343	1200
60	Gen. Elec.	MT-346	900
60	Westing.	CW	1200
50	Gen. Elec.	MT-336	1200
50	Westing.	CW	1200
50	Gen. Elec.	MT	900
50	Al. Ch.		900
40	Star	VS	1800
40	Wagner		1200
40	Lincoln	IXL	720
40	Westing.	CW	600
30/15	G.E.	OMT-336	600/1200
30	Gen. Elec.	MT-336	900
30	Wagner	BR	600
25	Gen. Elec.	MT	1200
15	Gen. Elec.	MT-322	900
10	Gen. Elec.	MT-326	1200
10	Gen. Elec.	MT-510	900
7½	Gen. Elec.	MTC5201	900

115 VOLT D.C. MOTORS

90	G. E.	DLC-65	900
79	G. E.	RC	975
40	G. E.	CD-125	400/600
40	G. E.	RC-12	1765
40	G. E.	RC	1160
30	G. E.	CD-85	1750
25	G. E.	RC-25	1800
20	West.	SK	650

230 VOLT D.C. MOTORS

150	G. E.	RC-36	1750
100	G. E.	CO-1831	675/1700
75	G. E.	CD-115	1150
75	Burke	WA-9	1150
75	El. Dyn.	25S	700/1050
75	El. Dyn.	311N	400
60	G. E.	LC	900

230 VOLT D.C. MOTORS—Cont.

60	Roth		900
50	G. E.	CO-1810	725/1800
35	G. E.	DLC	875
35	G. E.	CD	1150
35	Reliance		405/1200
30	West.	SK	950
30	G. E.	LC	825/2000
20	West.	SK	1800
20	Al. Ch.		625
20	G. E.	RF-11	500/1500
15	G. E.	CD	1200
15	Cr. Wh.	CMC	900/1800
15	West.	SK	825
15	West.	SK-90	825/1650

AC MOTORS
DC MOTORS
AC GENERATORS
DC GENERATORS
M.G. SETS
FREQ. CHANGERS
AIR COMPRESSOR
BLOWERS
FANS
METERS
PANELBOARD
STARTERS
HOISTS
WELDERS
TRANSFORMERS

15	G. E.	RLC	600/1800
15	G. E.	RF-11	400/1200
8	West.	SK-110L	300/450
5½	West.	SK	500/1500
5	West.	SK	400/1600
3	G. E.	RL-55	500/1500

550 VOLT D.C. MOTORS

50	G. E.	CD-113	1000

A.C. GENERATORS

200	K.W. G.E. ATB .8 PF.	720
150	K.W. Al. Chalmers	900
150	KVA G.E. TRB	900
150	KW G.E.	600

A.C. GENERATORS Continued

100	KVA West.	1200
90	KVA Triumph	360
75	KVA G.E. ATB	1200
50	KVA Westing.	1200
30	K.W. Fair.-Morse	1200
15	K.W. Gen. Elec.	1200

5 to 20 K.W. A.C. Generators single phase and 3 phase, revolving armature and revolving field.

250 VOLT D.C. D.C. MOTOR GENERATOR SETS

175 K.W. G.E. MPC, 230 V. 1200 RPM cpd, interpole generator, 3 ph. 60 cy. 2300 V. Motor.

150 K.W. Ridgway 230 V. 900 RPM cpd, interpole, 3 ph. 60 cy. 220/440 V. Synch. Motor.

100 K.W. Ridgway 275 V. Synch. Converter, 1200 RPM, 3 ph. 60 cy. 4100/2300 V.

100 K.W. Burke, 3 wire, 125/250 V. 900 RPM, 3 ph. 60 cy. 2300 V. Synch. Motor.

30 K.W. G.E. CD 250 volts, 1800 Motor 3 ph. 220/440 volts.

125 VOLT D.C. GENERATORS

75 K.W. West. SK, 125 volt, 1200 RPM, 3 ph. 220/440 Synch.

60 K.W. West. 125 V. 1200 RPM 3 ph. 60 cy. 220/440 V. Synch. Motor.

50 K.W. Sprague D 900 RPM

50 K.W. Gen. Elec. RC-35 1150 RPM.

125 VOLT D.C. GENERATORS—Cont.

45 K.W. Gen. Elec. CL-35 975 RPM.

40 K.W. Gen. Elec. CD105, 1200 RPM.

35 Ideal M.G. Set 3/60/220 V. motor.

15 K.W. Cr. Wheeler M.G. Set.

15 K.W. Cr. Wheeler CCD, 1150 RPM.

12½ K.W. Ridgway, 1200 RPM.

8½ K.W. Gen. Elec. CD-83 900 RPM.

5 K.W. Westing. M.G. Set.

10—1 K. W. to 3 K.W. M.G. Sets.

ELECTRIC HOISTS

6 Ton Yale & Towne 220 V. D.C.

4 Ton Gen. Elec. 230 V. D.C.

2 Ton American 220 V. A.C.

2 Ton Detroit 220 V. D.C.

1 Ton Shepard 220 V. D.C.

1 Ton Shepard 220 V. D.C.

½ Ton American 220 V. D.C.

¼ Ton American 220 V. D.C.

FREQUENCY CHANGERS

15 to 50 K.W. Frequency Changers, belt and motor driven, 90, 100 and 120 volt, 12 in stock.

AIR COMPRESSORS

12½x12 American 390 cubic feet.

PARTIAL LISTING

of over 5000 Motors, Generators and Electrical Equipment.

142-144 GRAND ST.
NEW YORK CITY, N. Y.

Here's the best values in power equipment . . . .

WE BUY

Power Equipment—anything from a single unit to an entire power plant intact, and as it stands on foundations. Let our experienced engineers inspect your plant and submit our attractive offers without cost to you.

SPECIAL OFFERS

RECTIFIERS

MERCURY ARC

Automatic and Manually operated. 1200 KW Brown Boveri complete units. For immediate shipment.

WE SELL

MOTORS AND GENERATORS

1—G.E. 300 KW continuous current Generator, Type MPC, class 4-300-720 Interpole, volts no load 525, full load 575. Sync. Motor PF-1, Type ATI. Class 10-345, 720, Form C. HP 435, volts 6600, Amp. 30 cyc. 60, with exciter.

1—G.E. 500 KW continuous current generator, type MPC, Class 4.500-720. Form H, 833 Amp. 550 volt, Motor, P.F. 8. Type ATI. Form C, Class 10-700-720, 700 RPM, 2300 Volts, 175 amps. 60 cyc.

2—G.E. 425 HP. synchronous motors, class 10-720, Form C, Type ATI, 720 RPM 6600 volt, 28.4 amp. 60 cyc.

UNIFLOW ENGINE SET

1—250 KW Gen. Elec. Ames Uniflow Engine set, 3 phase, 60 cyc., 480 volts, 200 RPM, direct connected to 22x24 engine, with exciter.

TURBO GENERATOR SET

1—200 KW 3 phase, 60 cycle, 480-volt, Allis Chalmers generator direct connected to a Terry steam turbine 150# steam pressure, 20# back pressure.

TRANSFORMERS

All sizes, oil and air cooled.

ROTARY CONVERTERS

300 to 2000 KW 600 volts, 23 and 60 cyc. Modern Interpole units.

H. E. SALZBERG CO., INC.

"Established 1898"

11 PARK PLACE • NEW YORK CITY

TELEPHONE RECTOR 2-1890-1-2-3

AC MOTORS—3 PH—60 CY.

HP	MAKE	TYPE	VOLTS	SPEED
2500	Whse	Syn.	4000/2300	720
2100	GE	ATI-syn.	2300	360
2000	GE	ATI syn.	2300	450
1400	GE	ATI-syn.	4000/2300	514
1400	Whse	Syn.	2300	514
1080	Whse	Syn.	2300/4000	900
1000	Whse	Syn.	4600/2300	400
900	GE	ATI-syn.	2300	720
700	GE	ATI-syn.	2200	720
550	GE	ATI-syn.	2200	720
500	Cr.Wh.	Sl-Rg	440	443
500	Al.Ch.	Sl-Rg	4000/2300	500
450	Whse	CW-Sl-rg	2200	875/700
450	Wnse	Syn.	440	257
400	Al.Ch.	Sl-Rg	2300	505
400	Whse	CW-Sl-Rg	440	450
300	Al.Ch.	ANY-Sl-Rg	2200	585
300	Whse	CW-Sl-Rg	2300	1170
300	GE	Syn.	440	600
250	GE	MT-Sl-Rg	4000/2300	257
250	F.M.	BV-Sl-Rg	2200	1200
250	Whse	CW-Sl-Rg	2200	500
250	Whse	CW-Sl-Rg	440/220	585
250	Whse	CI-Sl-Rg	220/440	900
250	Cr.Wh.	Q-Sl-Rg	440/220	435
250	GE	IE-Sq.Ca.	220/440	1750
250	Al.Ch.	Sq-Ca.	220/440	1150
225	E.M.	Syn.	2300/4150	450

AC GENERATORS—3 PH—60 CY.

KVA	MAKE	TYPE	VOLTS	SPEED
1–2500	Whse		4000/2300	720
1–2000	GE	ATI	2300	450
1–1700	GE	ATI	2300/4600	360
1–1100	Whse		4400/2200	400
1–1000	Whse		2300	900
2– 937	Al.Ch.		2300	450
1– 750	Whse		480	3600
1– 700	GE	ATI	2300	720
1– 625	Whse		2300	720
1– 560	GE	ATI	2300	720

MOTOR GENERATOR SETS

3 Phase—60 Cycle

1—1700 KW Whse 170/340 V. 3U consisting of (2) 850 KW 170V. & 2500 HP 2300V. Syn.*
1—1250/1500 KW Whse 125/250V. 3U consisting of (2) 625/750 KW 125V. & 1930 KVA 2300V. Syn.*
1—1500KW G.E. 600V. & 2100HP 2200V. Syn.
1—1500KW G.E. 275V. & 2100HP 2200V. Syn.
1—1000KW G.E. 250V. & 1400HP 2300V. Syn.
1—1000KW G.E. 600V. & 1400HP 6600/2200V. Syn.
2—1000KW G.E. 600V. & 1400HP 2200V. Syn.
1—750KW Whse 600V. & 1100HP 2300V. Syn.
1—750KW G.E. 275V. & 1100HP 2300V. Syn.*
1—500KW Whse 275V. & 700HP 2300V. Syn.
1—500KW G.E. 600V. & 700HP 2300V. Syn.*

* With exciter.

3 Phase—25 Cycle

1—2000KW Al/Ch. 275V. Gen. d.c. to 2200KVA 12000/6600V. Syn. Motor.
1—300KW G.E. 250V. Gen. d.c. to 435HP 440V. Syn. Motor.
1—250KW G.E. 250/125V. 3U consisting of (2) 125KW 125V. Gens. d.c. to 390HP 6600/2200V. Syn. Motor.

TURBO GENERATOR

Generator: 1000KW D.C. 250/125V. 3-wire 4000 amp. 514 RPM, #2458269, connected thru reduction gear to steam turbine, 150/175# condensing extraction type 3600RPM. Complete with surface condenser, pumps and switchboard.

DIESEL, ENG. GEN. SET

200HP McIntosh & Seymour 8-cylinder V type 500RPM d.c. to 135KW DC G.E. Gen. Can furnish AC Gen.

GAS. ENGINE GENERATOR SET

200KVA-350HP Sterling-Viking, 6-cylinder, 1200 RPM, engine with dual ignition, oil and fuel filter, mechanical governor, tachometer and oil pressure gauge. Mounted on common steel base with 200KVA Whse. .8PF, 220V. 3 phase, 4-wire, 60 cycle, AC generator and 2½KW, 1200RPM, 125V. exciter. Complete with generator switchboard and automatic voltage regulator.

TRANSFORMERS, POWER & DISTR.

KVA	MAKE	PH.	TYPE	VOLTAGES
1–4000	GE	3	WCT	79600/66000/44000–2300
2–3000	GE	3	HT	11000–9900x2300
2–2500	Packard	3	AT	13800/6900–7800x2300
1–1000	Pitts.	3	ODSC	2300/440
3– 300	GE	1	H-RP	2400–120/240
1– 300	Whse	3–2	SK	2300–2300
3– 250	Maloney	1	C	13800/7800x440/220
3– 200	Allis-Ch	1	OISC	2300x230/460
1– 150	Whse	3	ST	4800x480/240
3– 100	GE	1	H-KS	4000x230/460
3– 100	Pitts.	1	OISC	2300–115/230
2– 100	GE	1	OISC	2200/1980x120/240
2– 100	GE	1	H-SW	2400x240/120
1– 100	Whse	1	Subway	13200/125

DC MOTORS—230 Volts Adjustable Speed

HP	MAKE	TYPE	SPEED
1–875	GE	MCF	480/720
2–600	Whse		150/270
1–550	GE	MCF	240/720
1–400	GE	MPC	150/300
1–370	GE	MPC	120/160
1–300	GE	MPC	350/550
2–300	Whse	SK	150/300
1–250	Whse	SA	250/750
1–200	Whse	SK	500/1000
1–150	GE	MPC	250/450
2–150	Whse		125/225
1–125	Cr.Wh.	CMC-125H	500/1000
1–125	Whse	SK	225/900
1–125	Cr.Wh.	CMC	500/1000

500/600 Volts

1–3000	Whse	Interpole	50/70
2–1250	Whse	Interpole	330/400
1– 800	Whse	Interpole	200/300
2– 300	Whse	Interpole	250/400
3– 130	Cr.Wh.	CMC	1200

BELYEA Co., Inc.
43 Howell Street
JERSEY CITY, N. J.

TRANSFORMERS

OUTDOOR TYPE • OIL COOLED • 60 CYCLE

3—G.E. 50 KVA HK 4200/230/460
3—Pitts 100 KVA 2200/220/440
2—WE&M 37½ KVA S 2300/230/460
2—Pitts 37½ KVA 2300/230/460
3—Pitts 100 KVA 2300/230/460
5—GE 100 KVA 4200/230/460
3—GE 100 KVA HKS 2300/230/460
1—WE&M 100 KVA SK 2300/230/460
1—WE&M 75 KVA SK 2300/230/460
3—GE 75 KVA HKR 11000/2300—Unused
2—GE 50 KVA HGQT 6600/13200/115/230/460
3—GE 15 KVA HN 2300/230/460
3—GE 75 KVA 25 cycle 2300/230/460
3—Pitts 25 KVA 2300/230/460
6—GE 15 KVA 2300/230/460
6—GE 25 KVA 2300/230/460
3—GE 10 KVA 2300/230/460
6—WE&M 5 KVA 2300/230/460
3—GE 1½ KVA 2300/230/460
1—GE 10 KVA 2200/244/488
3—GE 1500 KVA 23000/2300/4000y
6—GE 400 KVA 22000/11000/2300/4000y
3—Pitts 100 KVA 22000/11000/230/460
3—WE&M 37.5 KVA 2300/115/230
11—Pitts 15 KVA 2300/115/230
1—WE&M 50 KVA 4000/115/230
2—GE 100 KVA 4200/115/230
1—GE 50 KVA 2300/115/230
2—WE&M 15 KVA 4000/115/230
1—Pitts 7.5 KVA 4600/115/230
1—WE&M 15 KVA 4000/115/230 3 ph
1—WE&M 5 KVA 4000/115/230 3 ph
5—GE 25 KVA 2300/115/230
1—WE&M 30 KVA SK 4600/115/230
1—WE&M 30 KVA 2200/244/488
1—WE&M 25 KVA S 2300/115/230
1—WE&M 5 KVA 4800/2400/115/230
4—WE&M 5 KVA 2300/215/230
3—GE 3 KVA 2300/115/230
3—GE 1½ KVA 2300/115/230
2—WE&M 10 KVA 2300/115/230
1—Maloney 3 KVA 4160/120/240
3—WE&M 15 KVA SK 4600/115/230
1—Pitts 10 KVA 4600/115/230
1—GE 15 KVA 4600/115/230

MOTORS

Special Items At Bargain Prices

SLIP RING MOTORS
220/440 Volts, 60 Cy. 3 Ph.

250 H.P. WEM	CW		503 RPM
400 H.P. WEM	CW		1200 RPM
250 H.P. GE	I-M		585 RPM
100 H.P. GE	I-M		600 RPM
100 H.P. WEM	CW		900 RPM
100 H.P. GE	MTC	5552	690 RPM (new)
40 H.P. WEM	CI	654D	690 RPM (new)
200 H.P. WEM	CI		585 RPM
200 H.P. WEM	CW		500 RPM
300 H.P. GE	I-M		585 RPM 3 bearing

2200 Volts, 60 Cy. 3 Ph.

300 H.P. GE	I-M	585 RPM 3 bearing
300 H.P. GE	LE 15	1200 RPM
400 H.P. WEM	CW	1200 RPM
	with full magnetic control	

SQUIRREL CAGE
220/440 Volts, 60 Cy. 3 Ph.

200 H.P. GE	I-M	1800 RPM
300 H.P. Allis		900 RPM
100 H.P. GE	KT 543	1800 RPM
100 H.P. GE	I-K	450 RPM
100 H.P. WEM	CS	870 RPM
75 H.P. GE	I-K	720 RPM
300 H.P. GE	IE 15B	1200 RPM
40 H.P. GE	KF 504	900 RPM BBear (new)
40 H.P. GE	KF 445	1200 RPM BBear (new)
50 H.P. GE	KF 504	1200 RPM BBear (new)
60 H.P. GE	KF 505	1200 RPM BBear (new)

2200 Volts, 60 Cy. 3 Ph.

200 H.P. GE	IE 15B	1200 RPM
300 H.P.	Allis	1800 RPM
40 H.P. Elec. Machy.		1800 RPM
50 H.P. WEM	CS	900 RPM

In addition to the above, which are being offered at bargain prices, we carry in Scranton stock hundreds of others, A.C. and D.C. motors, motor generator sets, mine locomotives, hoists and other items.

We are prepared to rent—buy—sell or exchange equipment of all sizes and types. Wire—write or 'phone your requirements or send us your lists of equipment for disposal.

PENN ELECTRICAL ENGINEERING COMPANY

Phones 8175—6—7—8

537 ASH STREET SCRANTON, PA.

THE BOILER HEADQUARTERS

LARGEST STOCK A.S.M.E. BOILERS IN THE EAST

PARTIAL LISTING—READY FOR IMMEDIATE SHIPMENT

VERTICAL

1—70 HP—114# pres.
1—50 HP—113# pres.
1—45 HP—100# pres.
1—30 HP—147# pres.
1—30 HP—100# pres.
1—25 HP—125# pres.
1—18 HP—100# pres.
1—12 HP—100# pres.
3—10 HP—100# pres.

H. R. T.

3—200 HP—150# pres.
1—125 HP—125# pres.
1—100 HP—125# pres.

WATER TUBE

3—380 HP Heine—180# pres.

SELF-CONTAINED

1—210 HP Stanwood—125# pres.
1— 85 HP Erie City Econ.—125#
1— 80 HP Titusville Scotch Marine—125#
1— 80 HP Penna. return tube—100#
1— 70 HP Titusville return tube—125#
1— 30 HP Erie City Econ.—100#
1— 6 HP Leffel Scotch Marine—100#

WHEN YOU NEED A GOOD BOILER

and Want To Make A Worth While Savings

THINK OF

M. J. HUNT'S SONS

1600 NO. DELAWARE AVE., PHILADELPHIA, PA.

Call on Us for Any Other Power Plant Equipment You May Need

WE ARE ALSO INTERESTED IN THE PURCHASE OF POWER PLANTS, ETC.

Note well this name

O'BRIEN

USED—GUARANTEED REBUILT—NEW
Power Plant Equipment Steam—Electric—Air
Metal Working Machinery Machine Tool—Structural—Etc.

OF PHILADELPHIA

AIR COMPRESSORS

Synchronous Motor Drive

1—1300 Cu. Ft. Ing. Rand PRE.
1—944 Cu. Ft. Ing. Rand XRE.
1—752 Cu. Ft. Sullivan WN3.
1—676 Cu. Ft. Ing. Rand XRE.

Belt—Steam

1—1400 Cu. Ft. Ing. Rand XPV Steam.
1—888 Cu. Ft. Ing. Rand XB2 Belt.
1—676 Cu. Ft. Ing. Rand XCB Belt.
1—528 Cu. Ft. Ing. Rand ER1 Belt.
1—368 Cu. Ft. Ing. Rand ER1 Belt.
1—368 Cu. Ft. Ing. Rand FR1 Steam

MOTOR GENERATOR SETS

1—1500 K. W. Westinghouse 260 Volt 3/60/13200/550 RPM.
2—1000 K. W. G.E. 300 Volt 3/60/2300/514 RPM.
1—750 K. W. G.E.—MPC 250 Volt 3/60/2300/720 RPM.
1—500 K. W. G.E.—MPC 250 Volt 3/25/2300/500 RPM.
3—100 K.W. Ridgway 250 V. 3/60/2300/1200 RPM.

HYDRAULIC PUMPS

3—6"x16" Aldrich Vert. Triplex 350 G.P.M. 1500 lb. M.D.
1—3"x18" Worthington 132 G.P.M. 2830 lb. M.D. Horiz.
1—3"x12" Deane Vert. 66 G.P.M. 1500 lb.

BLOWERS & EXHAUSTERS

150 Units in stock 6" to 60" Inlet Ventilating, Materials Handling, Positive Pressure —Belt & M.D.

ENGINE GENERATOR SETS

500 K. W. Skinner Uniflow 3/60/2300.
360 K. W. Skinner Uniflow 3/60/480.
300 K. W. Skinner Uniflow 250 D.C.
200 K. W. Skinner Uniflow 3/60/240.
150 K. W. Skinner Uniflow 250 D.C.
150 K. W. Skinner Uniflow 3/60/220.

ELECTRIC MOTORS

3 phase	MOTORS	60 cycle
200 H.P.	G.E. IK	1200
150 H.P.	F.M. Syn.	900
150 H.P.	A.C. Sq.Cg.	900
135 H.P.	A.C. Sl. Rg.	385
125 H.P.	A.C. Sq.Cg.	720
100 H.P.	G.E. IM	900
125 H.P.	West. C.W.	600
100 H.P.	G.E. IK	720
100 H.P.	West. Syn.	900

TURBO GENERATOR SETS

1—2500 K. W. Allis-Ch. Cond. 3/60/2300.
1—1250 K. W. G.E. Extraction 3/60/2300.
2—1000 K. W. G.E. Extraction 3/60/2300.
1—500 K. W. G.E. Non-Cond. 3/60/2300.
1—350 K. W. Moore Non-Cond. 2/60/240.
2—300 K. W. G.E. Surf. Cond. 3/60/480.
1—250 K. W. Moore Extraction 2/60/240.
1—150 K. W. Westinghouse Non 3/60/2300.
2—100 K. W. Westinghouse Non 3/60/2300.
1—80 K. W. Terry Non-Cond. 125 V. D.C.

A.S.M.E. BOILERS

2—315 H.P. B.&W. Stirling 200 lb. Stokers.
2—150 H.P. Hor. Self Cont. 125 lb.
3—20 H.P. Locomotive 150 lb.

THE O'BRIEN MACHINERY CO.

CABLE ADDRESS OBRIEN PHILA

115 N. THIRD ST., PHILADELPHIA, PA.

TELEPHONE MARKET 0727

MOTOR GENERATOR SETS

3 ph.—60 cy. Synchronous Motors

1500 KW West'house 250 volts DC, 514 RPM
600 KW Al. Chalmers 275 volts DC, 600 RPM
500 KW Gen. Elec. 275 volts DC, 720 RPM
300 KW Gen. Elec. 275 volts DC, 720 RPM
300 KW Gen. Elec. 600 volts DC, 720 RPM
240 KW Gen. Elec. 250 volts DC, 1200 RPM
200 KW Gen. Elec. 275 volts DC, 1200 RPM
200 KW Gen. Elec. 120 volts DC, 900 RPM
200 KW Gen. Elec. 70/140 volts DC, 3-unit
150 KW West'house 275 volts DC, 1200 RPM
150 KW Gen. Elec. 600 volts DC, 1200 RPM
100 KW Gen. Elec. 250 volts DC, 1200 RPM
100 KW Gen. Elec. 125 volts DC, 1200 RPM
75 KW Gen. Elec. 250 volts DC, 1200 RPM
75 KW Gen. Elec. 125 volts DC, 1200 RPM

SPECIAL OFFERINGS

1—3000 KW Gen. Elec. 225/285 volt DC Rotary Converter, 6 phase, 60 cycle

5—360 KVA to 2500 KVA 3 phase, 25/60 or 60/25 cycle Frequency Changers

1—500 KVA Westinghouse Synchronous Frequency Changer, 3 phase, 25/60 or 60/25 cycles, 240/480/550/2300 volts, 750 RPM, with direct connected exciters.

1—625 KVA Al. Chalmers Low Pressure Condensing Turbo Generator, 480/240 volts, 3 phase, 60 cycle, 3600 RPM, 16# abs. or 150# ga. steam pressure

3 PHASE, 60 CYCLE MOTORS

1500 HP Slipring 300 RPM
710 HP Gen. Elec. Synchronous, 720 RPM
650 HP Al. Chal. Synchronous, 1200 RPM
450 HP Gen. Elec. Squirrel Cage, 720 RPM
315 HP Gen. Elec. Synchronous, 600 RPM
300 HP Gen. Elec. Slip Ring, 514 RPM
300 HP West. Slip Ring, 360 RPM, New. (2)
250 HP Gen. Elec. Squirrel Cage, 1800 RPM
250 HP Al. Chal. Squirrel Cage, 600 RPM
200 HP West. Slip Ring, 720 RPM
200 HP West. Synchronous, 225 RPM
150 HP Gen. Elec. Synchronous, 900 RPM
150 HP Gen. Elec. Slip Ring, 900 RPM (2)
150 HP Gen. Elec. Slip Ring, 600 RPM
100 HP West. Slip Ring, 600 RPM (2)
75 HP West. Slip Ring, 720 RPM (2)
50 HP West. Slip Ring, 1200 RPM (12)

CHICAGO ELECTRIC COMPANY

1320 W. 22nd St., Chicago, Ill.

ALTERNATORS

25 KVA. F.-M. 220/60/3/1800
37½ KVA. G.E. 2300/60/3/1200
75 KVA. West. 440/60/3/900
90 KVA. G.E. 440/60/3/1200
112 KVA. G.E. 550/60/3/1200

AIR CIRCUIT BREAKERS

800 Amp. West. AC. 3 pole
1500 Amp. G.E. DC. 2 pole
2000 Amp. I.T.E. AC 2 pole
4000 Amp. I.T.E. DC 3 pole

COMPENSATORS

75 HP. West. 220/60/3
150 HP. G.E. 2200/60/3
200 HP. G.E. 220/60/3
300 HP. G.E. 440/60/3

GENERATOR SETS

25 KW. West. 125 V. DC, 220 v. AC
50 KW. Cr.-Wh. 250 V. DC, 220 V. AC
90 KW. G.E. 125 V. DC, 2200 V. AC
100 KW. G.E. 125 V. DC, 440 v. 25 cy. AC
100 KW. G.E. 125 V. DC, 2200 v. 2 ph. AC
150 KW. Ridgeway, 250 V. DC, 2200 V. AC

AC MOTORS SL. R.

40 HP. G.E., 440/60/3/900
150 HP. G.E., 440/60/3/450
250 HP. G.E., 2200/60/3/390

SYN. MOTORS

60 HP. G.E. 440/60/3/900
112 HP. G.E. 440/60/3/1200
350 HP. West. 440/60/3/300

25 CYCLE MOTORS

75 HP. G.E. sq. cage, 440 v. 1500
150 HP. G.E. sq. cage, 440 v. 1500
150 HP. G.E. syn. 4400 v. 750
300 HP. G.E. sl. rg., 440 v. 500

DC MOTORS

100 HP. G.E. 230 v. 1800 RPM.
100 HP. El. Dy. 230 v. 450/900 RPM.
120 KW. G.E. 125 v. 720 RPM. gen.

OIL SWITCHES

400 amp. G.E. 7500 volt
600 amp. West. 7500 volt
800 amp. G.E. 600 volt
1200 amp. West. 2500 volt
1500 amp. G.E. 4500 volt
2000 amp. Condit. 2200 volt

TRANSFORMERS

15 KVA. 440 v. prim. 110 v. sec.
75 KVA. 2200 volt prim. 220/440 v. sec.
300 KVA. 6600 volt prim. 440 v. sec.

WANTED

3000 ampere plater
100 HP adjustable speed DC motor, 300/900 RPM.
3000 ampere oil switch
5000 ampere 3 pole AC air breaker

Partial stock list, all items stocked for prompt shipment. Write, wire or phone your requirements, and surplus listings

ELECTRIC EQUIPMENT COMPANY

347 NORTH CLINTON AVE. MAIN 252 ROCHESTER, NEW YORK

UTILITIES ELECTRICAL MACHINERY CORPORATION

Specializing in modern power plant machinery

STEAM TURBO GENERATOR UNITS
100 to 10,000 K.W.

UNAFLOW & 4 VALVE ENGINES
Direct connected to A.C. or D.C. Generators
50 to 750 K.W.

MOTOR GENERATOR SETS
100 to 1500 K.W.

ROTARY CONVERTERS
200 to 5000 K.W.

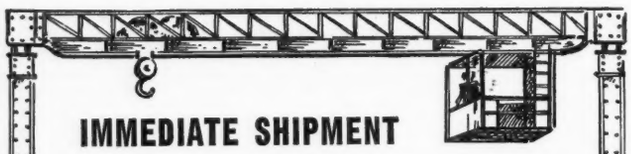
FREQUENCY CHANGER SETS
300 to 5000 K.W.

TRANSFORMERS
100 to 2000 K.V.A.

ALTERNATING AND DIRECT CURRENT MOTORS
All sizes

Send for our special lists of available equipment.
Your inquiries solicited.

Utilities Electrical Machinery Corporation
421 National City Bank Building, Cleveland, Ohio



IMMEDIATE SHIPMENT

OVERHEAD ELECTRIC TRAVELING CRANES

2—2 & 5 ton Shepard 31'6" & 34'8" span, 230-V. D.C. (Ft. Cont.)
2—5-ton Bedford 24'0" span, 230-V. D.C.
2—5-ton Whiting 32'8" & 49'10" span, 220-V. A.C.
1—5-ton Niles 34'5" span, 230-V. D.C.
1—5-ton Alliance 43'5" span, 230-V. D.C.
2—7½-ton Milwaukee 22'6" span, 220/440/550-V. A.C.
3—5-ton Milwaukee & Northern 100'0" span, 230-V. D.C.
1—10-ton Shepard 40'0" span, 230-V. D.C.
2—10-ton Bedford 50'0" & 75'0" span, 230-V. D.C.
1—10-ton Shepard 67'2" span, 230-V. D.C. (2-hooks)
2—15-ton Bedford 54'1½" span, 230-V. D.C.
1—15-ton Whiting 56'6 span, 230-V. D.C.
1—20-ton Toledo 34'4" span, 230-V. D.C. (5-ton aux.)
1—20-ton Niles 43'4" span, 230-V. D.C. (2-10-ton trolleys)
1—20-ton Shaw 56'0" span, 230-V. D.C. (5-ton aux.)
1—20-ton Northern 75'0" span, 220-V. A.C. (25-cycle)
1—37½-ton Cleveland 75'0" span, 230-V. D.C. (10-ton aux.)
1—30-ton Morgan 56'0" span, 230-V. D.C. (7½-ton aux.)
1—135-ton Alliance Ladle Crane 54'3½" span, 230 V. D.C.

(We Carry the Largest Stock of Crane and Mill Motors and Control Equipment)

MOTORS—CONTROLLERS—ELECTRIC BRAKES

60—Westghse type K-1 to 10, 230-V. D.C. 1 to 60-HP.
15—G.E. CO type, 2 to 50-HP., 230-V. D.C.
12—Westghse MCA & MCB Nos. 20-30-50-60, 230-V. D.C.
10—G.E., Westghse & C. H. Electric Brakes 230-V. D.C. 10 to 35-HP.
25—G.E., & Westghse Cranes Motors, 2 to 50-HP. 220 & 440-V. A.C.
62—G.E., Westghse, C.H. & E.C. & M. controllers 2 to 50-H.P. A.C. & D.C.

ELECTRIC MONORAIL HOISTS

12—½-1-2-3 ton Shepard & LoHed 230-V. D.C.
6—1-2-3-5 ton Shepard & Sprague 220-V. A.C.
4—3000 lb. Northern 2-motor type 220-V. A.C.
5—3 & 5 ton Shepard 230-V. D.C. 2-motor type.

AIR COMPRESSORS

6—150'-250'-350' I.R., Chicago, Penna. Belt Driven
4—700'-1722' I.R. & Chicago M.D. 220-V. A.C. Sync. Motors

"Send us your inquiries—Offer us your surplus equipment."

T. B. MAC CABE CO.
Beury Bldg., 3701 No. Broad St., Phila., Pa.

AIR COMPRESSORS

SAVE 40 TO 60%

ALL MAKES AND SIZES

TWO STAGE

2650 CFM	Ing.Rand PRE2	3-60-2200
2193 CFM	Ing.Rand PRE2	3-60-4160
1300 CFM	Sullivan WN31	3-60-440
1300 CFM	Chicago OCE	3-60-220
1300 CFM	Penn- DCE2	3-60-220
1300 CFM	Ing.Rand PRE2	3-60-2200
1300 CFM	Chicago OCB	Belted
808 CFM	Bury VCCE	3-60-440
608 CFM	Chicago OCB	Belted

Single Stage Horizontal
28 CFM to 1084 CFM 25 lbs to 100 lbs

Single and Two Stage Vertical
8 CFM to 300 CFM

Over 200 Compressors in Stock

REMANUFACTURED — GUARANTEED
or
SUBJECT TO INSPECTION

AMERICAN
AIR COMPRESSOR CORP.
559 HAMILTON AVENUE BROOKLYN, N. Y.
Compressor Mfg. for 39 years

The Searchlight Section of this paper

features Employment, Equipment and Business Opportunities identified with the industry it serves.

"Searchlight" ads are referred to regularly by readers interested in such "Opportunities."

You can therefore bring "Opportunities" you have to offer to the attention of these readers quickly, and at small cost, through an advertisement in the Searchlight Section.

ELECTRICAL EQUIPMENT

MOTOR GENERATORS
250/275 volt D.C. synchronous units complete with manual switchboard equipment.
2—300 KW General Electric
1—200 KW Westinghouse
4—200 KW Ridgway
2—150 KW General Electric
1—100 KW Westinghouse
1—100 KW General Electric
2—100 KW Ridgway
2—100 KW Allis-Chalmers
2— 75 KW General Electric
1— 50 KW Ridgway
1— 40 KW Westinghouse
Above units largely for 2300 volts A.C., some also for 4000 volts A.C., some for 440 volts A.C.

ROTARY CONVERTERS
250/275 volt D.C., pedestal bearing units, 6 phase, 1200 RPM, with transformers and switchboards.
1—500 KW Westinghouse
1—300 KW Allis-Chalmers
1—200 KW Westinghouse
1—200 KW General Electric
1—150 KW General Electric
Also several 500/550 volt D.C. Synchronous units

TRANSFORMERS
2—100 KVA Al. Ch. 2300-115/230
2—100 KVA G.E. 2300-230/460
2—100 KVA Al. Ch. 2300-230/460
3—100 KVA G.E. 2200-110/220
3— 75 KVA Pittsburgh 4000-200/440
3— 75 KVA G.E. 2200-244-488
2— 50 KVA G.E. 2200-110/220
3— 50 KVA Pittsburgh 2200-220/440
3— 50 KVA W'stgh 2200-220/440
3—37½ KVA G.E. 2200-220/440
3— 25 KVA G.E. 440-110/220
3— 25 KVA Al. Ch. 2300-230/460
2— 25 KVA G.E. 2200-220/440
3— 15 KVA G.E. 2200-110/220
2— 5 KVA W'stgh 2200-220/440

AIR COMPRESSORS
1—528 CFM, 100# Ing.-Rand 14x12"
1—528 CFM, 100# Chi.-Pneu. 14x12"
1—386 CFM, 115# Ing.-Rand 12x12"
2—368 CFM, 100# Ing.-Rand 12x10"
1—368 CFM, 100# Chi.-Pneu. 12x10"
1—254 CFM, 125# Ing.-Rand 10x10"
1—254 CFM, 100# Chi.-Pneu. 9½x10"
1—240 CFM, 100# Penn. 10x9"
1—195 CFM, 100# Worthington 9½x9"
2—173 CFM, 100# Ing.-Rand 9x8"
1—136 CFM, 125# Chi.-Pneu. 8x8"

SLIP RING MOTORS
For 220, 440 and 2200 V. with control
1—450 HP Wstgh. type CW 500 RPM
1—400 HP Lincoln type 1XY 585 RPM
2—200 HP G.E. type IM 575 RPM
1—200 HP W'stgh. type CW 580 RPM
1—150 HP Al. Ch. 3 brg. 705 RPM
1—150 HP W'stgh. type CW 700 RPM
1—125 HP Cr. Wh., type SR 885 RPM
1—100 HP G.E., type IM 900 RPM
1— 82 HP G.E., type ITC 490 RPM
1— 75 HP W'stgh, type CW 870 RPM
1— 75 HP W'stgh, type CI 855 RPM
1— 52 HP G.E. type ITC 860 RPM
1—50 HP Al. Ch, t'pe ANY 1160 RPM
1— 40 HP G.E. type MTC 900 RPM
2— 30 HP W'stgh, type CI 855 RPM
1— 30 HP W'stgh. type CW 865 RPM
2— 25 HP G.E., type IM 865 RPM

SQUIRREL CAGE MOTORS
For 220, 440 and 2200 V. with control
1—200 HP G.E. type IK 1200 RPM
1—180 HP G.E. type IK 1200 RPM
1—150 HP G.E. type IK 720 RPM
1—100 HP Al. Ch. type AN 690 RPM
1—100 HP G.E. type IK 720 RPM
2—100 HP G.E. type KT 1800 RPM
1—100 HP G.E. type IK 1800 RPM
1— 75 HP Lincoln type IL 1800 RPM
2— 75 HP W'stgh type CS 700 RPM
1— 75 HP G.E. type KT 900 RPM
1— 75 HP El. Dynamic 1200/600 RPM
1— 50 HP Al. Ch. type AR 3600 RPM
1— 50 HP G.E. type KT 1800 RPM
1— 50 HP.W'stgh type CS 1800 RPM
2— 50 HP G.E. type KT 1200 RPM
1— 40 HP G.E. type IK 1800 RPM
1— 40 HP G.E. type KT 900 RPM
2— 30 HP G.E. type KT 900 RPM

• TURBO GENERATORS • ENGINE GENERATORS
• GENERATORS A.C. & D.C. • D.C. MOTORS
• SYNCH. MOTORS • FREQ. CHANGERS • CENTRIFUGAL PUMPS
• CONDENSERS • SWITCHBOARDS • ENGINES OIL & GAS
• STARTERS • CONTROL ACCESSORIES • CIRCUIT BREAKERS

FOR YOUR ELECTRICAL NEEDS CONTACT

OUR 37TH YEAR

JOHN D. CRAWBUCK CO.
1406 EMPIRE BLDG., PITTSBURGH, PA.

M-G SETS & CONVERTERS
3 ph. 60 cy. synchronous
500 KW G.E. 250v-2300v 720 RPM
500 KW Burke 250v-2300v 600 RPM
300 KW Westgh. 550v-2300v 1200 RPM
300 KW Ridg. 250v-2300/4000v 1200 RPM
200 KW Westgh. 250v-2300v 1200 RPM
200 KW Westgh. Rotary 250v-2300v
150 KW G.E. 250v-2300v 1200 RPM
100 KW Ridg. 250v-2300v 1200 RPM
50 KW Chandy. 250v-2300v 900 RPM

ENGINE-GENERATOR SETS
100 KW 250v Westgh. Bessemer Oil Eng.
500 KVA G.E. 240/480/3/60 E. Ball Steam

SLIP RING MOTORS
2000 v. 3 ph. 60 cy. Contactor Control
750 HP Cr. Wh. 250 RPM
700 HP G.E. 393 RPM
500 HP G.E. 435 RPM
400 HP Cr. Wh. 350 RPM
300 HP Cr. Wh. 350 RPM
250 HP G.E. 590 RPM
200 HP Cr.Wh. 440 RPM
150 HP Wstgh. 860 RPM

TURBO GENERATOR SETS
750 KW Westgh. 250v D.C. Mixed Pressure
125 KVA Allis Ch. 220/440/3/60 Turbo

AIR COMPRESSOR (100#)
2200 CFM. Chg. Pnue. Steam
1090 CFM. Ing. Rd. Belted
550 CFM. Ing. Rd. Belted
175 CFM. Ing. Rd. ERI Belted

Large stock AC & DC motors, Generators, Transformers, Pumps, Hoists, Cranes, etc.

MOORHEAD-REITMEYER CO. INC.
30th & Brereton St. Pittsburgh, Pa.

$CHEINERT'$ =$AVING$= make YOU Profits

PRICED FOR QUICK SALE

SLIP RING MOTORS
3—100 HP Westinghouse type CW, 3 phase, 60 cycle, 2200 volt, 900 speed slip ring.
2— 75 HP Westinghouse type CW, 3 phase, 60 cycle, 220/440 volt, 720 speed slip ring.

SYNCHRONOUS MOTORS
1—100 HP Electric Machinery Company 3 phase, 60 cycle, 2200 volt, 600 speed with belted exciter.
1—160 HP Westinghouse 3 phase, 60 cycle, 440 volt, 900 speed with direct connected exciter.
1—200 HP Westinghouse 3 phase, 60 cycle, 440 volt, 1800 speed with direct connected exciter.
1—200 HP General Electric type ATI, 3 phase, 60 cycle, 2200 volt, 720 speed with direct connected exciter.

MOTOR DRIVEN PUMP
1—1400 GPM Goulds figure #3300, 2 stage, 310 foot head centrifugal pump mounted on common base and direct connected to a 200 HP Westinghouse 3 phase, 60 cycle, 440 volt, 1800 speed synchronous motor with starting equipment.

MOTOR GENERATOR SETS
3—100 KW Ridgway 250 volt, 1200 speed compound wound generators mounted on common base and direct connected to a 150 HP Ridgway 3 phase, 60 cycle, 2200 volt, 1200 speed, 80% P.F. synchronous motor with both AC and DC Panels.
1—225 KW Ideal factory built motor generator set, generator 125 volts, 900 speed mounted on common base and direct connected to a 325 HP Ideal 3 phase, 60 cycle, 2300 volt, 900 speed synchronous motor with both AC and DC panels.

AIR CONDITIONING EQUIPMENT
4—5000 Cubic Foot Carrier Corporation conditioning units with 2 HP 3 phase, 60 cycle, 220 volt Fan motors, 1¼" x 1½" Jennings pump driven by a 2 HP 3 phase, 60 cycle, 220 volt, 3500 speed motor. Three units without heaters, one unit with heater.

We also stock a diversified line of A.C. & D.C. Motors, Engines, Transformers, Compressors, Rotary Converters and Turbo Units.

Offer us your surplus equipment, whether individual items or complete plants—for

IMMEDIATE CASH DISPOSAL

R. SCHEINERT
2132 E. SUSQUEHANNA AVE.
PHILADELPHIA, PA.

BOILERS

1—New 460 HP Wickes, 160# Oil Burner
2—New 862 HP Casey-Hedges 180# with stokers
2—511 HP Union, 200#, complete steam plant
3—778 HP B.&W. Horiz. 200#, with stokers

GENERATOR SETS

1—300 KVA Diesel F-M, 3/60/480
1—175 KVA Diesel F-M, 3/60/440
2—125 KVA Diesel Buckeye, 3/60/2400
1—750 KW Westg. Turbo, 3/60/2300, 3600 RPM
1—1000 KW G.E. Turbo, 250 V. D.C., 3600 RPM
1—1250 KVA G.E. Turbo Gen. only, 3/60/2300, 3600 RPM
3—500 KW G.E. Curtis, 3/60/2300 complete plant, including 3, Heine Type H Boilers
1—5000 KW Westg. Turbo, 3/60/11000, 3600 RPM
1—6000 KW M.G., 3/60/13200 motor & 600 V. D.C. Generators

PUMPS

1—1000 GPM Centrifugal Manistee with 100 HP, 3/60/2200 motor
1—700 GPM Centrifugal Manistee with 50 HP, 3/60/2200 motor

AIR COMPRSSORS

1—700 CFM I-R Type 10, steam
1—2000 CFM, Snow, direct gas engine driven

MOTORS

11—50 H.P. & 25 H.P., New G.E. Type MTC, 3/60/440 Motors & Allen Bradley Controllers
1—100 H.P. New G.E. Motor, 720 RPM, 3/60/2300, complete with new magnetic primary & secondary controls

OVERHEAD CRANES

1—10-ton Northern 70′ span 3/60/220
1—40-ton Browning, 50′ span, 3/60/440
1—50-ton Alliance, 86′ span, 230 v. D.C.
1—60-ton Morgan, 55′ span, 230 v. D.C.

OTHER POWER PLANT UNITS TOO ! ! !

IRON & STEEL PRODUCTS, INC.
13488 So. Brainard Avenue
Chicago, Illinois
"Anything containing IRON or STEEL"

DEPEND ON DELTA

• McBRIDE AND McCLENNEN •

FOR DEPENDABLE EQUIPMENT

AIR COMPRESSOR—522 C.F.M. Worthington 13"x14"
AIR COMPRESSOR—148 C.F.M. Pennsylvania 2-Stage 250 Lb.
A.C. GENERATOR—56 KVA G.E. Type ATI 3 ph., 60 cy., dir. con. Exciter
ARC WELDER—750 Amp. Westinghouse multiple arc 3 ph., 60 cy., motor
BLOWER—#110 American Sirocco Steel Plate, 42" inlet 16,000 to 26,000 C.F.M.
BOILER—100 HP Erie City Economic 125 Lb., A.S.M.E.
CENTRIFUGAL PUMP—180 G.P.M. Worthington M.D. 336′ Head, 3" s. 3 ph., 60 cy. motor
ELECTRIC HOISTS—2—3,000 Lb. Shaw Box 3 ph. motors
ENGINE GENERATOR SET—100 KW G.E., Type ATB, 3 ph., 60 cy., Harrisburg Engine
HYDRAULIC PUMPS—2—½"x4" Worthington Triplex 10,000 Lb. Pressure
OIL ENGINE—15 HP Otto Hor. Semi Diesel
SLIP RING MOTORS—2—40 HP Westinghouse CW 3 ph., 60 cy. 1160 RPM
TRANSFORMERS—3—200 KVA G.E. Type H Single Phase 2300-440/220
TURBO COMPRESSOR—250 C.F.M. Spencer 16 oz. 3 ph. motor
VACUUM PUMP—73,400 sq. ft. radiation surface, 8"x12"x12" Wheeler, 6" suction

Above list represents only a few items from our power equipment department. We also have a full line of machine tools.

DELTA EQUIPMENT CO.

148 N. THIRD ST. PHILADELPHIA, PA.

In Our Warehouse, Overhauled, Skidded, Ready for Immediate Delivery

ENGINE-GENERATOR SETS

200 KW G.E. 3/60/220 to 17x20 Erie Ball 4 valve
150 KW GE. 3/60/220 to 17x20 Erie Ball 4 valve
145 KW G.E., 3/60/220 to 17x20 Ames Uniflow
120 KW G.E. 3/60/480 to 15x16 Skinner Uniflow
100 KW G.E. 3/60/240 to 14x14 Erie City, Baker Valve
75 KW G.E. 3/60/220 to 15x13 Harrisburg Fleming Piston Valve
70 KW G.E. 3/60/220 to 15x13 Harrisburg Fleming Piston Valve
50 KVA C.W. 2/60/220 to 13x12 American Ball, Slide Valve
75 KW (2) G.E. D.C. 110/220 to 12x16 Erie Ball 4 Valve
75 KW G.E. D.C. 110/220 to 16x14 Ideal Piston Valve
50 KW G.E. D.C. 110/220 to 12x12 Ball, Baker Valve

TURBINE

156 KVA 3/60/220 Whse, 125#

What Do You Need? What Have You To Sell?

WASHINGTON ELECTRIC CO. INC.
14 Astor Place New York City
Spring 7-0415

-TRANSFORMERS-

SPECIAL

40— 5 KVA Allis-Chalmers, 6900-115/230 V.
35—25 KVA Gen. Electric, 6900-230/460 V.
Prices quoted on request.

We Rewind, Repair and Redesign all Makes and Sizes
ALL TRANSFORMERS GUARANTEED FOR ONE YEAR
Write for Catalog No. 134-F

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI, OHIO

WANT QUICK DELIVERY?

300 KW **Skinner Uniflow** 480 or 2300 volt. Side crank. #10415. Used nominally. Fine shape.
200 KW **Skinner Uniflow** 220/440 volt, 19x20 engine 225 rpm. With exciter & switchboard.
240 HP 200 KVA **Fairbanks Morse Diesel Generator.**
180 HP **Fairbanks Morse** 3 and 6 cyl. **Diesel Units.**
120 HP Atlas 6 cyl. **Diesel Power Unit.** Clutch.
2—80/150 HP **Buda Gas-Gasoline or Oil Engines.**
3—1200 HP **McIntosh Seymour** 8 cylinder **Diesels.**
48 HP **Cummins** 4 cyl. 1200 rpm **Diesel.** Like new.
80-100-200-300-500 to 840 HP **Fairbanks Diesels.**
150 HP **Casey Hedges Scotch Marine Boiler.**
3—778 HP **B & W** 200# **Boilers.** With Stokers.
2—500 HP **Heine** 200# Straight tube **Boilers.**
1—600 HP **Edgemoor** 200# Water tube **Boiler.**
200 KW to 10,000 KW **Steam Turbine Generators.**
3—333 KVA 1/60/2300 to 115/230 V. **Transformers.**

All Types Good Equipment — Bought and Sold

Mississippi Valley Equipment Co.
507 Locust St., St. Louis, Mo.
Also Hoists, Derricks, Cranes, Tanks, Steel Sheet Piling, Boilers, Motors, Compressors

---

AC MOTORS

50 HP. 1800 RPM. 3/60/440 V. Gen. Elec. KT
75 HP. 1800 RPM. 3/60/220 V. Gen. Elec. KT
75 HP 720 RPM. 3/60/220 V. Gen. Elec. MT
150 HP. 900 RPM. 3/60/440 V. Gen. Elec. 1M
150 HP. 720 RPM. 3/60/2300 V. Gen. Elec. MT

AC GENERATORS

15 KVA. 1200 RPM. 3/60/220 V. Fairbanks Morse
50 KVA. 1200 RPM. 3/60/440 V. Fairbanks Morse
85 KVA. 1200 RPM. 3/60/220 V. Allis-Chalmers
300 KVA. 600 RPM. 3/60/440 V. General Electric

TURBO GENERATOR

125 KVA. 3/60/480 V. Gen. Elec. non-condensing

TRANSFORMERS

50 KVA. (3) 1/60/2300-220/440 V. Gen. Elec. H
100 KVA. (3) 1/60/2300-220/440 V. Gen. Elec. H

DIESEL GENERATOR

44 KVA. 1200 RPM. 3/60/240 V. Gen. Elec. ATB generator belted Venn Severin oil engine

AIR COMPRESSORS

92 CFM. 100# Ingersoll-Rand class ER-1, 7x6
173 CFM. 100# Chicago Pneumatic type NSB, 9x8

ROCKFORD ELECTRIC EQUIPMENT CO.
721 South Wyman St. Rockford, Illinois

GENERATING EQUIPMENT

FOR SALE

1—600 KW **SKINNER** Unaflow Engine Generator Set 3/60/440/2300—non-condensing.

1—250 KW **WESTINGHOUSE** Turbo Generator 2/60/220 Bleeder type. Can be changed to 3 phase.

Both Perfect Condition.

Consolidated Products Co., Inc.
14-17 Park Row New York City

1—1000 KW **G.E. Turbo Generator Unit**
1—375 KVA **Ridgway** 4 valve **Engine Unit**
1—3500 KW **Westinghouse Turbo Generator Unit**
1—1500 KW **Westinghouse Turbo Generator Unit**
1—150 KW **GE MG Set** 250 volts DC
1—500 KW **Westinghouse Rotary Converter,** 250 volts
3—2000 HP 600 volt variable speed **Direct Current Motors**
9—100 KVA **Transformers**
1—600 cubic feet **Air Compressor**
1—50 HP **Motor-driven Hoist**

TIPPINS MACHINERY COMPANY
Koppers Building
Pittsburgh, Pa.

BARGAIN

MOTOR GENERATOR SET

75 KW, 125 volts DC, General Electric three bearing motor generator set with 115 HP, 3 phase, 60 cycle, 1200 RPM, squirrel cage motor.

FREQUENCY CHANGER

5 KW Louis Allis, 120 cycles, 3 phase, 60 cycle, driven by a 220/440 volt, 3 phase, 60 cycle motor.

THE MOTOR REPAIR & MFG. CO.
1556 Hamilton Ave. Cleveland, Ohio

TURBINE GENERATOR UNITS

3 Phase 60 Cycle 240/480/600/2400 Volts

2500 KVA GENERAL ELECTRIC condensing, 150-250 lbs. with surface condenser
1250 KVA ALLIS CHALMERS non-condensing, 125-150 lbs.; 0-6 lbs. back pressure
937 KVA GENERAL ELECTRIC condensing, 200-250 lbs. with surface condenser
375 KVA WESTINGHOUSE non-condensing, 100-200 lbs.; 0-15 lbs. back pressure

ENGINE GENERATOR SETS

3 Phase 60 Cycle 240/480/600/2400 Volts

750 KVA WESTINGHOUSE-SKINNER Uniflow, 150-200 lbs.; 0-5 back pressure
500 KVA GENERAL ELECTRIC-SKINNER Uniflow, 120-130 lbs.; 0-5 lbs. back pressure
438 KVA BURKE-AMES Vertical Uniflow, 125-150 lbs.; 0-6 lbs. back pressure
375 KVA GENERAL ELECTRIC-SKINNER Uniflow, 125-160 lbs.; 0-5 lbs. back pressure
250 KVA GENERAL ELECTRIC-SKINNER Uniflow, 125-150 lbs., 0-5 lbs. back pressure
210 KVA GENERAL ELECTRIC-AMES Uniflow, 150-175 lbs.; 0-5 lbs. back pressure
210 KVA GENERAL ELECTRIC-SKINNER Uniflow, 125-150 lbs.; 0-5 lbs. back pressure
187 KVA GENERAL ELECTRIC-SKINNER Uniflow, 125-150 lbs.; 0-5 lbs. back pressure

ENGINE GENERATOR SETS

125 Volts Direct Current

350 KW BURKE-AMES Vertical Uniflow, 125-150 lbs.; 0-6 lbs. back pressure
125 KW GENERAL ELECTRIC-SKINNER Uniflow, 115-175 lbs.; 0-15 lbs. back pressure

MOTOR GENERATOR SETS

3 Phase 60 Cycle 2300 Volts

600 KW ALLIS CHALMERS synchronous, 250 volts D.C.; 900 RPM
500 KW GENERAL ELECTRIC synchronous, 250 volts D.C.; 720 RPM
500 KW WESTINGHOUSE synchronous, 600 volts D.C.; 720 RPM
150 KW GENERAL ELECTRIC synchronous, 250 volts D.C.; 900 RPM

This is a partial list. Send us your inquiries.

THE NATIONAL POWER MACHINERY CO.
1921 SCRANTON RD. CLEVELAND, OHIO

ELECTRICAL BARGAINS

1—**360 KVA,** 220 volt, **Gen. Elec. Capacitor,** with rack and transformers.
1—**400 KW,** 125/250 volt, **Ridgway Unaflow Unit,** engine 24x28: about 10 years old.
1—**150 KW,** 250 volt, **Gen. Elec.** to 18x20 Skinner unaflow engine: fine condition.
1—**6000 KW,** 3 phase, 60 cycle, 2300 V., 3600 rpm, **Gen. Elec. Turbo Generator** with Worthington surface condenser.
1—**360 HP Fairbanks-Morse full Diesel,** still on original foundation: excellent condition.
1—**2000 KW,** 3 ph., 60 cycle, 2300 V., 3600 rpm, **Gen. Elec. Turbo Generator:** fine shape and a real bargain before removal.
1—**2100 HP,** 3 ph., 60 cycle, 2300/4600 V., 514 rpm, **Gen. Elec. Syn. Motor.**
1—**300 KW,** 250 volt, 1200 rpm, **Westgh. Generator** to a 420 HP, Westgh., 2300 V. syn. motor.
4—**550 KVA,** 2300x115/230 V. **Kuhlman Transformers.**

This is just a partial list of our immense stock. We have Motors, Generators, Oil Circuit Breakers, etc.

Send for Catalog

WHAT HAVE YOU FOR SALE?

GEORGE SACHSENMAIER CO.
8403 Hegerman St.
Holmesburg Phila., Pa.

POWER PLANT EQUIPMENT

TURBO-GENERATORS
750 KW. G.E. Non-Cond. 2300 V.
500 KW G.E. Cond. 2300 V.
100 KW. G.E. Non-Cond. 3-60-550 V.

BELTED GENERATOR
500 KVA. G.E. 225 RPM-3-60-550 V.

AIR COMPRESSORS
2—1775 Cu. Ft. I R Duplex 25 lbs.
1—1090 Cu. Ft. Chic. Motor Drive, 550 V.
1—2865 Cu. Ft. I. R. 35 lbs. Motor 2300 V.

BOILERS
1—518 H.P. Heine 250 lbs. Mass. Std.
1—300 H.P. B. & W. Sterling 150 lbs.
3—200 H.P. H.R.T. 160 lbs. Mass. Std.

FOUNDRY EQUIPMENT
1—4 Ton Charging Scale Car. Never Used.

INDUCTION VOLTAGE REGULATOR
195 KVA G.E. Prim. volts 11,000 sec. amps. 137

A. LEE ELLIS CO., U. S. Mchy. Bldg., Boston, Mass.

The Buyer Must Be Satisfied—Always

SYNCH. MOTOR GENERATORS

750 KW WEST. 250 V. 2400 A.C., 900 RPM
300 KW G.E. 250 V. 2300/4000 A.C., 1200 RPM
300 KW G.E. 550 V. 2300/4000 A.C., 1200 RPM
300 KW WEST. 250 V. 2300/4000 A.C., 900 RPM
200 KW G.E. 250 V. 2300/4000 A.C., 1200 RPM
200 KW G.E. 550 V. 2300/4000 A.C., 1200 RPM
150 KW G.E. 250 V. 2300/4000 A.C., 1200 RPM
150 KW WEST. 250 V. 2300/4000 A.C., 1200 RPM
100 KW G.E. 250 V. 2300 A.C., 1200 RPM
50 KW A.C. 250 V. 220/440 A.C., 1200 RPM
25 KW WEST. 250 V. 220/440 A.C., 1750 RPM

SYNCHRONOUS CONVERTERS

300 KW G.E. 250 D.C. 2300/4000 A.C., 1200 RPM
300 KW G.E. 550 D.C. 2300/4000 A.C., 1200 RPM
200 KW G.E. 250 D.C. 2300/4000 A.C., 1200 RPM
200 KW R.W. 250 D.C. 2300/4000 A.C., 1200 RPM
150 KW R.W. 250 D.C. 2300/4000 A.C., 1200 RPM

AIR COMPRESSORS

1190' I-R, XB Belted 2300 V. Ind. Mt. 100#
1052' I-R, XCB, Belted 2200 V. Syn. Mt. 100#
1050' I-R, PRE-2, Dir. Con. 2300 V. Syn. Mt. 100#
676' I-R, XRE, Dir. Con. 2300 V. Syn. Mt. 100#

(Each unit listed above is owned by us and is available for immediate inspection and shipment.)

WHAT HAVE YOU FOR SALE?

WALLACE E. KIRK COMPANY
Incorporated
502 Grant Building, Pittsburgh, Pa.

INDUSTRIAL MACHINERY

ELECTRIC MOTORS
15 HP, single phase, 60 cycle
30/50 HP Allis-Chalmers, slip ring
200 HP, 60 RPM, 2300 V., Squirrel Cage

STEAM ENGINES & GENERATORS
50 KW, 250 V., DC Generator connected to Erie Ball Engine
100 KVA, 2300 V., 3 Phase, 60 Cycle, 257 RPM, Generator connected to 125 HP Chuse Corliss Engine

AIR COMPRESSORS
10x10 Ingersoll-Rand
10x6½x10 Ingersoll-Rand
18¼x6x10 Ingersoll-Rand

MISCELLANEOUS
10 KVA, 3 phase, 25 cycle, Engine-Generator Set (Syntron)
35 KW, 250 V., DC Generator connected to 50 HP, AC Motor

We have many other items, such as engines, generators, ice machinery.

BERT TOLBERT MACHINERY CO., 505 West Weatherford St., Fort Worth, Texas

DIESEL UNITS
300 KVA (2) Fairbanks Morse VA, 6 cyl. (operating)
250 KVA Wghse.-Worthington (operating)
250 KVA Fairbanks Morse—6 cyl. VA (operating)
200 KVA Fairbanks Morse model 32, 4 cyl. (operating)

BOILERS (ASME)
323 HP (2) Springfield sectional type cross drum, 200#, Gas, oil or stoker fired.
300 HP Murray (Heine) 200#
252 HP (2) B & W, 250# sectional type

ENGINES (BELTED)
24x30 Erie Ball 4 v.
20x21 Skinner Uniflow
16x20 Erie Ball 4 v.
13x15 (2) Skinner Uniflow, for direct connection or belt drive

750 KW Wghse. **TURBINE** Unit, 250# initial, 12# back pressure
750 KW Wghse. **TURBINE** Unit, 250#, 150 deg.; (condens. & extrac.) Surface Condenser
500 KW G.E. **TURBINE** Unit, (condens. & bleeder) (Surface Condensor)

BOILER PLANT
2—300 HP Heine 170 lbs. ASME; Detroit Stokers, heater and stacks

DIESEL UNIT
135 KVA G.E. Alternator with 180 HP Muncie full **Diesel** 3 cyl. Engine direct connected exciter (operating).

TURBINE UNITS
2500 KW (2) Allis Chalmers (Surface Condensor)
1000 KW G.E. (Surface or Jet Condensors)
750 KW (2) Allis Chalmers (Mixed Pressure)
300 KW (2) G.E. (Surface Condensor)

ENGINE SETS
750 KVA G.E.—Erie City Lentz
450 KVA G.E.—Skinner Uniflow
375 KVA G.E.—Skinner Uniflow
312 KVA G.E.—Harrisburg 4 V.
250 KVA G.E.—Skinner Uniflow
187 KVA G.E.—Erie Ball 4 V.

OIL BURNING UNIT
Ames fuel oil pumping and heating unit; with pumps, oil heater, regulators, burners. Capacity 1000 to 5000 HP.

POWER PLANT EQUIPMENT CO., INC., 39 Cortlandt Street, New York, N. Y.

AIR COMPRESSORS

INGERSOLL-RAND Type 10
22" x 16" x 13"; 1190 c.f.m.
SULLIVAN Type WJ-3
20" x 12" x 14"; 1094 c.f.m.
CHICAGO PENU. Type GCB
22" x 14" x 16"; 1055 c.f.m.
BURY Type BP4H
15" x 9" x 12"; 546 c.f.m.
GARDNER DENVER Class HA
17" x 10½" x 12"; 870 c.f.m. synch. motor drive
INGERSOLL-RAND Type 10
12" x 7½" x 12"; 327 c.f.m.
PENNSYLVANIA Class A
10" x 4½" x 10"; 250 c.f.m. @ 400# pressure.

We have these compressors priced very reasonably

LOUIS E. EMERMAN & CO.
1763 Elston Ave., Chicago, Ill.

DECEMBER SPECIALS

UNIFLOWS
1 500 KW Skinner Uniflow
1 250 KW Ames Uniflow
A.C. TURBO-GENERATORS
2 500 KW Condensing
1 200 KW Non-Condensing
AIR COMPRESSORS
2 1300 CFM, C.P. OCE
Synchronous Motor Driven
1 360 CFM, I-R, XRB, 200#
DIESEL ENGINE GENERATOR
300 KW McIntosh-Seymour
2300 V

"We Want Your Surplus Equipment"

BRILL EQUIPMENT CORP.
183 Varick St.
NEW YORK, N.Y.

MOTORS GENERATORS

Fans—Blowers—Equipment

Bought—Sold—Exchanged

LARGE COMPLETE STOCK

PARISER ELECTRIC MOTOR CO., INC.
165-7 Centre Street, N. Y. C.
One Year Guarantee

DIESEL ENGINES

1— 75 H.P. Buda, Automotive Type
1—120 H.P. Atlas Imperial Air starting
1—170 H.P. Busch-Sulzer Unit
1—200 H.P. Atlas Imperial Air starting

GENERATORS

1—125 K.W. Ft. Wayne AC Generator
1—150 KVA Crocker Wheeler
1—200 K.W. Westinghouse AC Generator
1—250 K.W. Westinghouse AC Generator
Large stock of reconditioned motors, generators, trolley locomotives, and combination locomotives.

Write for Bulletin

Morse Bros. Machinery Company
P.O. Box 1708 Denver, Colorado

FOR SALE: AIR COMPRESSORS

1—610 cu. ft. **I.R.** St. Dr. 100# air.
1—2000 cu. ft. **Wor.** St. Dr. 90# air.
1—7000 cu. ft. **A-C** St Dr 90# air.

STEAM PUMPING ENGINES

1—**Wor. Cr.** Com. C&F 1½ mgd Meyer Valve Gear.
1—**A-C 4 mgd** C&FW Cr. Com. Opp. Type Cond. 12-28x13x24.
1—**Snow** 6 mgd C&FW Cr. Com. Opp. Type Cond. 20-40x14¾x36.
2—**Snow** 10 mgd C&FW Cr. Com. High Duty Opp. Cond. 27x60x17x42.
1—10 mgd **DeLaval** St. Turb. Cent. pump 200' head.
All pumps with water wks. type cond.

STEAM TURBO GENERATOR

1—937 **KVA** 3600 RPM 3-60-2300 Whse.

BIRCH MANUFACTURING COMPANY
1521-1523 Sedgwick St. Chicago, Ill.

FOR SALE

GENERATING UNIT

ALLIS-CHALMERS 20"x42" 150 lbs.
Steam Engine Non-condensing, 110 R.P.M.
Releasing Corliss, direct connected to 250 KW, 230-240 Volt Compound Direct Current Generator, Complete with Switchboard.

We can supply photograph

NATIONAL LEAD CO.
722 Chestnut St. St. Louis, Mo.

FOR SALE

1000 KW BLEEDER TURBO

10,000, 5,000, 2000 & 1000 KW. TURBOS 60 CY.
20 T. HAND CRANE 58' SPAN
1500' SYN. MOTOR DRIVE AIR COMP.
3—30" VALVES NEVER USED. CRANE #462
2800' VERT. SUR COND. and Others.
100 TO 1600 HP. OIL ENGS.
36000 GPM 27' hd. 285 Rev. Cent Pump.
3—516 HP Boilers 200# Code (Stirling)
ROSS POWER EQUIPMENT CO., Indianapolis, Ind.

FOR SALE

2—100 KW, 125/250 volts, 1200 RPM, 3-Wire Crocker-Wheeler DC Generators.

ELECTRIC ENTERPRISE CO.
88 White St. New York City

WE BUY AND SELL

Power Plants, D.C. and A.C. Motors, Generators, Transformers, Pumps and Elec. Instruments. Give us the opportunity of bidding. NOTE: We carry a diversified stock and your inquiries will receive immediate attention. Satisfaction guaranteed.

Superior Electric Machinery Co.
2829 Cedar St. Philadelphia, Pa.

FOR QUICK DELIVERY

3—600 HP, B&W, Sectional 200# Boilers
1—460 HP, 160# 1938 NEW Boiler
1—400 HP, Heine, 180# Steel Case Boiler
1—400 HP, Keeler, 160 Cross Drum Boiler
2—300 HP, Bent tube 160# Boiler Plant
100 KW & 200 KW AC Uniflow Units
1250 KW G.E. Co. Turbo Generator

CHARLES B. REARICK
30 Church St. New York City

FOR SALE TURBOS

1,000 KW Ridgway
500 KW Allis Chalmers
300 KW General Electric
3 phase 60 cycle Condensing, Bargains, TERMS, TRADE.

CONTINENTAL SALVAGE & MACHINERY CORP.
221 Union Bldg. Cleveland, O.

USED BOILERS!!

Inspection guaranteed. All types and sizes, ready for immediate delivery. We can fill your requirements at the lowest possible price.

HAVE YOU ANY BOILERS FOR SALE?

The Acme Equipment Company, Inc.
6500 Epworth Blvd. Detroit, Michigan

We Buy and Sell Used Power Plant Equipment

Boilers ● Engines ● Generators
Electrical Equipment, etc.

INTERSTATE POWER EQUIPMENT CO.
Office and Warehouse
145 Vermont St., Brooklyn, N. Y.

OIL SWITCHES
AIR CIRCUIT BREAKERS
SAFETY SWITCHES

Bought—Sold

CIRCUIT BREAKER COMPANY
347 N. Clinton Ave. Rochester, N. Y.

FOR SALE

Diesel Engine Generator Sets, 1—150 HP; 1—100 HP Frick Uni-flow engine (excellent condition). All kinds of electric motors, generators, boilers and pumps. It will pay you to get our prices.

For further information write or wire

SOUTHERN MACHINERY COMPANY
BRENTWOOD, MARYLAND
Phones: Greenwood 2770, Greenwood 3649

FOR SALE

ELECTRIC SKIP HOIST

Beaumont; 90 ton hopper with gate for truck loading; in good condition. Complete information on request.

ORANGE MEMORIAL HOSPITAL
Orange, N. J.

Positions Vacant
and
Positions Wanted
Selling Opportunities
Employment Service
Book
Equipment For Sale
Equipment Rebuilding
and
Wanted (Equipment)
Advertising

Will be found on Page 253

FOR SALE

750 KW Synchronous Motor Generator Set

750 KW General Electric 250 volt, 3 wire, type MPC compound interpole, 3 bearing, 720 RPM, on C.I. sub-base flexibly coupled to 1100 H.P. type ATI Synchronous motor, 80% power factor, 3 phase 60 cycle 2300 volts 720 RPM, complete with fully equipped AC and DC panels, and 3 wire mechanism. Can be seen in operation.

NORTHWESTERN ELECTRIC & MACHY. CO.
450 N. Plankinton Ave.
Milwaukee, Wis.

3 POWER PLANTS FOR SALE

All 2300 V. 60 cy. 3 ph. 3600 Rev. Turbos with sur. cond. piping, valves, stokers, heaters and auxiliaries as now installed.

PLANT NO. 1
2—1000 KW. G.E. BLEEDER TURBOS
3—516 HP. 200# Code Stirling Boilers

PLANT NO. 2
1—2000 KW. G.E. Turbo with Sur. Cond.
2—400 HP. Stirling Boilers 180# Code

PLANT NO. 3
1—1000 KW. G. E. turbo
2—295 HP. Stirling 200# Boilers—stokers —piping auxs. etc. etc.
1—Water Softener 400 G.P.H. Capacity.

Sell above as whole or part

Northern Indiana Power Company
Jno. Walker, Ch. Eng.—
Indianapolis, Ind.

4—750 HP Kidwell Water Tube Boilers
2—1500 KW. 2300 Volt, Allis-Chalmers Turbo-Generators, with Jet Condensers
1—750 KW. 2300 Volt, Allis-Chalmers Turbo-Generator, Mixed Pressure Machine, with Jet Condenser
1—20 KW. G.E. Motor Generator, 60 Volt, 30 HP. 440 Volt Motor
1—75 KW. G.E. Motor Generator, 250 Volt, 100 HP. 2200 Volt Motor
3—25 HP. G.E. 2200 Volt, 1160 RPM, 60 cy.
3—30 HP. G.E. 2200 Volt, 1160 RPM, 60 cy.
17—500 KVA G.E. 22000/600 v., 3 ph., 60 cy.

PENSACOLA COMPANY
1100 Fourth Street, Berkeley, California

10,000 KW TURBO-GENERATOR

Westinghouse 200-250 Lbs. pressure, 3 phase, 60 cycle, 2400 volts, 1800 RPM. Jet condenser, exciter.

General Steel Castings Corp.
EDDYSTONE, PA.

GENERATOR SET

25 KW Engine Generator Set, 220 V, 60 Cy, 3 Ph, Harrisburg 8x10 Engine, new Baker Valve, GE Generator and Exciter for A.C. Current.

Too small for our use. Can be seen in operation at:

CITY CLEANING & LAUNDRY
Toledo, Ohio

FOR SALE:
GENERATING UNIT

One 16x16 Ames Uniflow Steam Engine direct connected to a 100 kw direct current generator 125 volts—800 amps., and 225 R.P.M. This unit can be operated condensing or non-condensing. It has been overhauled and is in excellent condition. Write us for a quotation.

Capital Ice Refrigerating Co., Inc.
356 West North Street, Indianapolis, Indiana.

OPPORTUNITIES!

in

New and used equipment recently released from service by a number of electric and gas utility companies.

POWER PLANT EQUIPMENT
CONSTRUCTION EQUIPMENT
SUBSTATION EQUIPMENT
TRANSMISSION LINE MATERIALS

Send for new list, . . . to

APPARATUS EXCHANGE
EBASCO SERVICES INCORPORATED
Two Rector St. New York, N. Y.

AIR COMPRESSORS

1100′ Ingersoll-Rand
1100′ Chicago Pneumatic
1050′ Worthington
700′ Chicago Pneumatic
529′ Chicago Pneumatic
365′ Ingersoll-Rand
365′ Chicago Pneumatic
200′ Ingersoll-Rand
100′ Gardner-Denver

ELECTRIC STEAM
DIESEL

DENNY & CLARK
910 N. Marshfield Ave., Chicago, Ill.

NEW AND USED PIPE FOR EVERY PURPOSE

Large stocks carried everywhere for spot shipment.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards (St. Clair Co.) **Ill.**

BOILERS

Buy Now — and Save Money!

All Makes, Sizes and Pressures

NEW and USED!

J. F. DAVIS
122 S. Michigan Ave. CHICAGO

TRANSFORMERS

WE SELL—PURCHASE—RENT

Power & Dist. Transf. From One to 5000 KVA. Any Volt, or Frequency

Catalogue and Prices on Request

Philadelphia Transformer Co.
2829 Cedar St. Phila., Pa.

Electrical & Steam Machinery

BOILERS

4—1000 H.P. Babcock & Wilcox, (Straight Tube) Water Tube Boilers 350# working pressure, set singly, with steel casings. Equipped with 225° F. Superheaters, Fuel Economizers and Stokers.

STEAM TURBINES

2—1500 K.W. Gen. Elec. 3 Ph., 60 Cy., 2300 Volts, 3600 RPM., 500° F. T.T.

MOTOR GENERATOR SETS

3—500 K.W., 3 Unit Gen. Elec., each set consisting of:
2—250 K.W., 115/130—230/260 volts, (For 3 wire operation) compound wound D.C. generators Interpole, with 720 KVA. 3 ph., 60 cy., 6600 Volt ATI. Synchronous Motors, 720 RPM.

FREQUENCY CHANGER SETS

2—540 KVA. 2 bearing sets each consisting of: Type ATB., Class 24-540-300, form C., 3 ph., 60 cy., 2300 volts, 300 RPM. generators with Type ATB., Class 10-540-300 Synchronous Motor 760 H.P. form C., 3 ph., 25 cy., 13200 volts, 300 RPM. Direct connected Exciters.

MERCURY ARC RECTIFIERS

7—1200 K.W. Brown Boveri Type GRZ 612, 600 volts, 2000 amps., formerly operated on 13,200 volts system, equipped with taps ranging from 10,000 to 14,000 volts. Can be utilized on 6900 volt system. With outdoor high tension switching equipment.

ARCHER & BALDWIN, INC.
75 West St., N. Y. C.
Tel.—BO 9-9275 & 9276

TURBO GENERATOR

625 KVA, 2300 V., 60 Cycle, 3 Phase, G.E. Condensing—Complete

ENGINE GENERATORS

200 KVA, 240 V., 60 Cycle, 3 Phase, Westinghouse-Hamilton.
720 KVA, 440 V., 60 Cycle, 3 Phase, G. E. Hamilton.
900 KVA, 2300 V., 60 Cycle, 3 Phase Westinghouse-Hamilton Twin Simple.

BOILERS

One—400 H.P. 3-Drum, 160 Lbs.
One—600 H.P. B&W Straight Tube, 200 Lbs.

JAMES T. CASTLE
424 First Ave. Pittsburgh, Pa.

Boilers-Generating Units

(3) 300 & (2) 258 H.P. **Union Iron Works, water tube boilers,** 178/200#, set 10′ high over Detroit forced draft, under feed, side dump stokers, soot blowers, Copes feed water regulators, draft gauges, flow meters, all piping & valves, stoker engine & blower.
(2) 230 H.P. **Babcock & Wilcox boilers** 200#, Jones stokers, soot blowers, stack.
(1) 50 ton (self contained) **coal hopper.**
(1) **Boiler feed water treating plant.**
(1) 156 KVA, (4) valve non-releasing **Corliss engine unit,** 3/60/240, board & direct connected exciter.
(1) 220 KVA, (4) valve releasing **Corliss engine unit,** 2 or 3/60/240, board & direct connected exciter.
(4) 7″x4½″x10″ **"Burnham"** simplex, double acting, brass fitted, piston pattern, **steam pumps,** like new, two pumps have water sealed piston rod.

H. P. BREARLEY
3423-91st Street, Jackson Heights, N. Y.

Reconditioned Motors, Generators, Control Equipment, etc.
Send for 32 page stock list.
Electric Apparatus & Repair Company
Specialists on Rebuilding Motors, Generators and Controls
1410 No. 6th St., PHILA., PA.

PROFESSIONAL SERVICES

Consulting Valuations Reports — Developments Appraisals Construction — Designing Testing Financing — Inspections Cost Analysis Investigations

OLIVER FIELD ALLEN
Licensed Professional Engineer New York State
Fellow: A.I.E.E. Member: A.S.M.E., S.A.E.
Am. Chem. Soc., Am. Mil. Engrs.
Consulting Engineer
Diesel Engines, International Engineering Liason
Gas and Oil Engine Power Applications
Regular Foreign Correspondent
117 Liberty Street, New York City
Cable Address: OFALL-New York

J. H. MANNING & COMPANY
ENGINEERS
Business Studies, New Projects, Purchase-Sales, Management, Valuations, Reorganizations, Mergers, Public Utility Affair (including Integration)
120 Broadway, New York — Field Building, Chicago

JOHN A. STEVENS, Inc.
Established 1909
CONSULTING ENGINEERS
Power Plants — Paper Mills
Dye Houses — Surveys
Lowell, Massachusetts

HALL LABORATORIES, Inc.
R. E. Hall, Ph. D., Director
CONSULTANTS ON
BOILER WATER CONDITIONING
304 Ross St. Pittsburgh, Pa.

SARGENT & LUNDY
INCORPORATED
ENGINEERS
140 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS

STONE & WEBSTER ENGINEERING CORPORATION
Design and Construction
Reports • Examinations • Appraisals
Consulting Engineering
BOSTON • NEW YORK • CHICAGO
PITTSBURGH • SAN FRANCISCO • LOS ANGELES

D. W. HAERING & CO., Inc.
Consultants, Analysts and Manufacturers on Scale, Corrosion and Proportioning Problems
2308 S. Winchester Ave., Chicago, Ill.

FRANCIS J. SILL
HEAT and POWER ENGINEERING
as applied to Industrial Plants
Tests—Reports—Design—Construction
Westboro, Massachusetts

THE J. G. WHITE ENGINEERING CORPORATION
ENGINEERS—CONSTRUCTORS
Steam and Hydraulic Power Plant Design and Construction, Investigation and studies of Power and Steam Problems
Reports and Appraisals
80 Broad St., New York

Month after Month after Month ...

Your sourcebook for the latest and best in products and practice

What you get in a typical issue

25 new products	2 methods articles	50 catalog items
15 practical kinks	2 operating articles	1 Geo. Edwards letter
2 plant descriptions	20 questions, answers	4 pages news
2 problem pages	1 data sheet	175 adv. pages

It pays you to read POWER every month

SEARCHLIGHT SECTION

EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or RESALE

UNDISPLAYED—RATE PER WORD:
Positions Vacant and all other classifications 10 cents a word, minimum charge $2.00.
Positions Wanted (full or part-time salaried employment only), ½ the above rates, payable in advance.
(*See ¶ on Box Numbers*)
Proposals, 40 cents a line an insertion.

INFORMATION:
Box Numbers in care of our New York, Chicago and San Francisco offices count 10 words additional in undisplayed ads.
Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH
The advertising rate is $6.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page.

Copy for new advertisements must be received by December 22nd for the January issue

Used Power Plant Equipment and Accessories Advertising

Will Be Found on Pages 236 to 251 and 253

Advertisers' Index

and

Products Index

on "Searchlight" cover page

POSITION VACANT

MECHANICAL ENGINEERS, technical graduates: One thoroughly experienced in engineering design specifications of mechanical section steam electric stations; other preferably experienced in heat balance work, power cost studies, engineering-economic problems and some experience engineering design specifications. Positions in the east. In first application give full particulars, age, education, citizenship, experience, references, salary desired. Address: Mechanical Engineer, P.O. Box 163, Trinity Station, N. Y. City.

EMPLOYMENT SERVICE

SALARIED POSITIONS. $2,500 to $25,000. This thoroughly organized advertising service of 30 years' recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details. R. W. Bixby, Inc., 270 Delward Bldg., Buffalo, N. Y.

POSITIONS WANTED

(*See also "Selling Opportunity Wanted"*)

ELECTRICAL ENGINEER—Maintenance and construction in large industrial plant. References. PW-946, Power, 330 W. 42nd St., New York, N. Y.

CENTRIFUGAL PUMP ENGINEER. Desires connection with progressive manufacturer. All preliminary data on new DS and MS split case line now ready. Over 23 years exclusively in this design field. PW-949, Power, 330 W. 42nd St., New York, N. Y.

WANTED

ANYTHING within reason that is wanted in the industry served by Power can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

HENDRICKS
CERTIFIED REBUILDING
. . . all types electrical machinery and control equipment. State your problem . . . write for prices.
ELECTRIC MOTOR SERVICE
627 Franklin St.
PEORIA, ILL.
22 yrs. Rebuilding Large Electrical Machinery

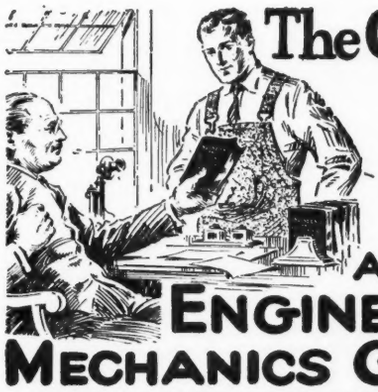
WANTED
Rotary Converters & Motor Generator Sets, 250 Volts D. C., 100 to 500 K.W.; A.C. and D.C. Motors; Electrical Mining Machinery and Locomotives, etc.
R. H. BENNEY EQUIPMENT CO.
5024 Montgomery Road Norwood, Ohio

IN LIQUIDATION
BOILERS
2—150 HP. **Keeler Fire tube,** 150# press.
1—200 HP. **Erie City,** 125 lbs. pressure
1—210 HP. **B&W Water tube,** 160# press.
4—500 HP. **B&W Water tube,** 180# press.
STEPHEN A. DOUGLASS CO.
660 Fort Washington Av., New York, N.Y

SELLING OPPORTUNITIES
OFFERED—WANTED
Selling Agencies—Sales Executives
Salesmen—Additional Lines

OPPORTUNITIES WANTED

INDUSTRIAL SALES ENGINEERS desire additional line either electrical or mechanical New York Territory write full particulars. SA-951, Power, 330 W. 42nd St., New York, N. Y.



The CHIEF said—

"The biggest favor I can do you is to advise you to send for this Master Set."

AUDEL'S ENGINEERS and MECHANICS GUIDES

A COMPLETE HOME STUDY COURSE AND REFERENCE LIBRARY
8 pocket Volumes with Ready Reference Index. 8754 pages, 4750 illustrations. Easy to read. Highly endorsed. A good help in securing Engineer's License. Price $12; terms $1 per month. Free trial.

CONFIDENCE COMES FROM KNOWING!
Shipped Free. Not a cent to pay until you examine the books. No obligation to buy until you are satisfied. Fill in coupon today. For better pay—bigger opportunities get this practical library now.

● **HELPFUL INFORMATION**—in a Handy Form—Answers your questions & problems. Here is a partial list of subjects covered—Engine Principles, Valve Setting, Pumps, Corliss Engines, Uniflow Engines, Pumping Engines, Contractors Engines, Locomotives, Marine Engines, Turbine Engines, Gas Engines, Diesel Engines, Indicators, Producers, Steam, Fuel Economy, Boiler Construction, Firing, Oil Burners, Stokers, Boiler Repairs, Pipe Fitting, Heating, Refrigeration, Elevators, Dynamos, Motors, Lighting, Wiring, Electrical Diagrams, Radio, Electrical Reference and Calculations.

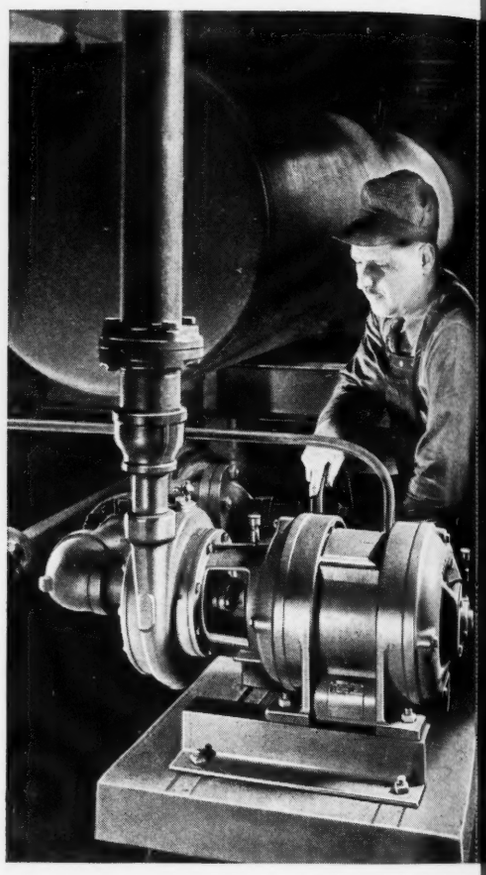
FREE BOOK—**FOR LIMITED TIME.** While edition lasts, "Audels Answers" will be included with each set of Audels Guides. Contains special information for those who want to go before the board to get a license. Makes Engineers exams easy. Send this coupon at once.

THEO. AUDEL & CO., 49 West 23rd St., New York City
Mail AUDELS ENGINEERS & MECHANICS GUIDES, 8 numbers, $12, & "Audels Answers" for free examination. If satisfactory, I will send you $1 in 7 days, then $1 monthly until $12 is paid.

Name.....
Address.....
Occupation.....
Power
Employed by.....

MORE PUMP FOR LESS MONEY!

That's What Plant Managers Say About SSUnit . . . The Fast-Selling Allis-Chalmers Pump . . . that Gives Them New Pumping Savings!



BEATING A SPACE PROBLEM IN A large brewery is only one of the ways this Allis-Chalmers SSUnit Centrifugal Pump (driven by a Lo-Maintenance Motor) is proving its adaptability and money-saving value!

It means something when men responsible for production in their plants say SSUnit pumps are giving them new lows in pumping costs... actually paying for themselves in big savings!

For that's what Allis-Chalmers engineers — the same engineers that designed and built the great Niagara Falls and Boulder Dam turbines—were shooting at when they originated the first motor-coupled pump in 1926!

And today that SSUnit pump is making news with its big, extra value features that make it the biggest, most profitable pump buy on the market!

You'll Like SSUnits!

You'll like the compact, husky design that cuts maintenance costs . . . beats space waste . . . lets you put the unit in any position you want it. The bronze construction of the enclosed runner, wearing rings and shaft sleeves . . . your protection against excessive wear and rust!

And because SSUnit Pumps are completely tested before delivery you know they're ready to go to work for you the minute they are installed.

Performance That Cuts Costs!

But you don't stop there! For coupled to the pump is the famous, Full-Measure constructed Allis-Chalmers Lo-Maintenance Motor . . . the motor that has proven performance records of beating conditions that many times wreck ordinary motors in a few weeks. There's no buck passing . . . Allis-Chalmers accepts full responsibility for both the motor and the drive.

Get started on real pumping savings today! Call the nearest district office or write direct to Allis-Chalmers, Milwaukee, Wis.

1097

. . . 90 Years of Engineering Superiority Work for You When You Specify Allis-Chalmers!

CENTRIFUGAL PUMP DIVISION

ALLIS-CHALMERS

MILWAUKEE · WISCONSIN

N A
this
ump
prov-
alue!

llis-
ibil-
ive.

oing
rest
t to
Vis.

1097

S

IN